HANDBOOK
OF
DIET
THERAPY

HANDBOOK OF DIET THERAPY

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FOR THE AMERICAN DIETETIC ASSOCIATION

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FOREWORD

The fact that this is the third edition of the *Handbook of Diet Therapy* speaks well for this little book. The *Handbook of Diet Therapy* is particularly significant because it emphasizes what might be called "optimum normal nutrition." Intelligent diet therapy should be molded around a basic food plan selected to provide the essentials of good nutrition, yet designed with consideration to the disease under treatment and the food habits of the individual patient. Among the new additions, the material on menu patterns and sample meals should be helpful, particularly when long-range changes in patterns of eating are indicated, as is the case in most problems of medical interest.

The field of diet therapy has been flooded with a variety of diets in controversial terminology. The simplification, clarity, and common sense of the material found in this *Handbook* are most valuable. We would all do well to clear our fields of overlapping material, follow the procedures suggested in the *Handbook*, and thereby avoid the confusions that often result in the minds of the hospital staff regarding therapeutic diets We need to teach plain, accurate, and simple facts about diet therapy in terms of normal nutrition in our medical, nursing, and dietetic schools. This *Handbook* will be helpful in such a program.

The first revision extended the material on low-sodium and diabetic diets; this new edition extends material on low-fat diets and includes useful information on the fatty acid content of foods. There are two main reasons for the increased interest in the quantity and

type of fat in the diet. One results from the "formula feeding" studies, which have uniformly shown that such diets made with a polyunsaturated fat such as corn or cottonseed oil result in a decrease in serum cholesterol. The other comes from epidemiologic studies, which suggest that some populations with lower fat intakes have lower levels of serum cholesterol. Contemporary researches indicate that many other aspects of nutrition may be involved in atherosclerosis, and no doubt, by the time another edition of this book is put out, more factual and useful information will be available.

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PREFACE

The purpose of the *Handbook of Diet Therapy* continues to be to provide aid in naming, defining, and describing therapeutic diets in line with dietetic principles. Up-to-date definitions of dietetic terminology have been taken from the *Revised Glossary of Dietetic Terms* (1958), which appears *in toto* in this edition.

Since the aim of the normal dietary regimen is to maintain or bring the patient to a state of nutritive efficiency, it is logical to assume that a therapeutic diet will be planned as nearly as possible to meet or exceed the requisites of the normal diet. With this principle in mind, the therapeutic diet has again been considered as a modification of the normal diet.

Therapeutic variants, however, are largely quantitative in nature. For this reason, the normal diet and all therapeutic diets have been assessed in quantitative terms which will permit simple and relatively accurate modifications, as well as a quick appraisal of the over-all nutritive content.

While a nutrient evaluation of each therapeutic diet has appeared previously, the description of the daily diet has been greatly extended to include a sample menu pattern, a description of food groups used, and sample meals. It is hoped that this addition may be helpful to the dietitian or physician in implementing the teaching of patients, students in nursing, medicine, social service, and dietetics.

Many chapters have been completely rewritten. The chapter on modifications in the fat and fatty acid content of the diet now includes an evaluation of the saturated and unsaturated fatty acids in a basic diet, a sample menu pattern, a description of food groups,

and sample meals. In addition, over 250 food items, together with values for saturated and unsaturated fatty acids, cholesterol, protein, and caloric values have been included, to facilitate modifications in the basic diet to suit various levels of, or ratios between, fats, fatty acids, and related nutrients.

A new chapter on protein modifications includes a discussion of adjustments in the protein level of the diet, protein fractions, and the amino acids, which have become of therapeutic interest. Of current interest is the phenylalanine-restricted diet, which has been illustrated for the possible use of patients with phenylketonuria. A discussion of the gliadin or glutamine-bound fraction of protein in wheat, rye, oats, and barley has been added for use in certain malabsorption syndromes. A table containing values for the eight essential amino acids, plus arginine and histidine in 202 food items, will be of value in appraising the amino acid content of the diet.

Chapters on the sodium-restricted diet, the low- and high-caloric diets, and the soft and low-fiber diets have been completely revised. In these chapters, also, sample menu patterns, descriptions of food groups, and sample meals have been added. It is not intended that any of these sample menu patterns or sample meals be considered rigid. Since dietary care will vary in terms of ethnic and cultural needs, it is hoped that these samples will be considered suggestive only and that adaptations to suit individual needs will be made from the innumerable combinations of foods available in the food groups.

Where it is desirable that a therapeutic modification be maintained over an extended period of time, special consideration should be given to the patient's food habits and his ability to make the necessary changes. The chapter by Margaret Mead on interviewing the patient serves as an introduction to the problem. New references have been added at the end of this chapter which may serve to broaden the understanding of the many psychologic and social factors involving in changing food habits.

The intent of the *Handbook* has been to bring together in one place information and data now widely scattered in many sources. In so doing, it is hoped that the professional worker and student will have a convenient reference and guide for use in dietetic practice.

DOROTHEA TURNER

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Since the aim of a dietary regimen is to maintain or bring the patient to a state of nutritive efficiency, it is logical to assume that a therapeutic diet will be planned to meet or exceed the dietary allowances for a normal individual. On the other hand, there are instances in planning a therapeutic diet in which less than the normal requirement may be indicated, as in caloric or sodium restrictions. Other nutrients, in these instances, should remain at or above the levels of the normal diet. With this principle in mind, it follows that the therapeutic diet will be planned as a modification of the normal diet.

In the organization of a plan for practical use, the first step will be to outline and appraise a basic plan of food intake for the normal dietary regimen. Since most modifications for therapeutic purposes will be of a quantitative nature, in terms of calories, protein, or other nutrients, the basic plan of normal diet will be appraised in these terms to make possible quick and easily assessed adjustments.

To achieve this goal as concisely as possible, space will not be given to itemizing and calculating individual items in a diet. Instead, a basic pattern of diet will be outlined simply in terms of commonly used food groups. With this plan, foods may be combined into groups which are comparable enough in nutrient content to permit substitution within a group. This plan has the advantage of permitting variety in choice, minimizing dietary calculations, and insuring a good nutrient content.

Four food groups have been used in amounts required to meet the

protein, mineral, and vitamin recommendations for the healthy individual. These *four groups include the milk group, the vegetable* and fruit group, the meat group, and the bread-cereal-potato-legume group. A fifth group—fats and sweets—has been considered separately, since this group adds comparatively little in protein, minerals, and vitamins but may instead be a major source of calories.

In the dietary patterns which follow, these groups have been outlined in the amounts necessary to meet the needs of the individual during adult life, pregnancy and lactation, childhood, adolescence, and after age sixty-five. In each case a nutrient evaluation has been made of the basic diet; each food group has been described; and a sample menu pattern and sample meals have been outlined as illustrations of the food plan.

In appraising the nutritive value of any dietary pattern, a question arises concerning the selection of figures on food composition for this purpose. In the past, nutritional accounting has been based on various tables of food composition. Widdowson and McCance (1)* have pointed out that there are two extreme schools of thought concerning food tables: "One tends to regard the figures in them as having the accuracy of atomic weight determinations; the other dismisses them as valueless on the ground that a foodstuff may be so modified by the soil, the season, or its rate of growth that no figure can be a reliable guide to its composition. The truth, of course, lies somewhere between these points of view."

In order to meet the need for representative values suitable for use in dietary calculations, the Food and Nutrition Board, National Research Council, and the Bureau of Human Nutrition and Home Economics, United States Department of Agriculture, in 1945 published *Tables of Food Composition in Terms of Eleven Nutrients* (2).

This publication has now been superseded by *Composition of Foods —Raw, Processed, Prepared* (U.S. Department of Agriculture, "Agriculture Handbooks," No. 8 [June, 1950]). Numerous foods not listed in the 1945 tables, as well as different forms of food—especially frozen and cooked foods—have been included. In this publication,

* Numbers in parentheses refer to works cited in the References at the end of each chapter.

calories have been calculated by a modification of the procedure that has been in use in this country for over fifty years. Instead of applying the general caloric factors 4, 9, 4 to the percentage of protein, fat, and carbohydrate, respectively, as has usually been done heretofore, more specific factors have been developed for individual foods or food groups.

The principle for this revised procedure of estimating caloric values was published in the report of the Committee on Caloric Conversion Factors and Food Composition Tables, convened by the Nutrition Division of the Food and Agriculture Organization (3). Details of applying this procedure in the estimation of caloric values have been reported by Merrill and Watt (4).

While figures taken from these tables serve a valuable function in making precise values available, it would still be a laborious procedure to make detailed computations of the nutritive value of each item in a menu over a prolonged number of days, unless use were made of a shortened method of calculation.

Leichsenring and Wilson (5) have demonstrated that this is possible with the use of representative mean values of foods when weighted in accordance with the findings of food-consumption studies in the United States Values from this shortened method of dietary calculation (Appendix I, Table 35, p. 124) have been used in the *evaluations of the nutrient content* of the dietary patterns which follow.

In extending representative values to a *daily food plan* which will serve as a gross guide for practical use, as well as in teaching allied groups or dietary personnel, advantage has been taken of the classification of foods in the basic food groups suggested by Hayes, Trulson, and Stare (6). In the *description* of alternates or substitutes within each of these groups, the "exchanges" originally developed for use in diets planned for patients with diabetes have been used (7). For the most part, the carbohydrate, protein, fat, and caloric values assigned in the exchanges approximate closely the values in the short method of dietary calculation of Leichsenring and Wilson (5). The greatest difference has been in the exchange value for meat, for which less fat and calories are indicated Obviously, this value depends in part on the amount of fat lost in cooking or wasted at the table, as well as the cut of meat used. In studies reported recently

by Leverton and Odell (8) significant losses were found, suggesting that the lower value might be appropriate for cooked meats. In view of these findings, values have now been brought into agreement.

A *menu pattern* and *sample meals* have also been outlined to illustrate the "daily food plan" and some of the choices possible within each of the four food groups. The fifth group—fats and sweets—has been considered separately to facilitate adaptations in calories.

Obviously, there is no "one" normal diet which must be consumed to insure nutritive sufficiency. Many foods may be combined in amounts which will meet individual needs. In selecting a basic plan, then, it would seem most suitable to combine commonly used foods in amounts which are the most generally acceptable.

TABLE 1

FOODS AVAILABLE FOR CONSUMPTION PER PERSON PER WEEK, SPRING, 1955

Vegetables and fruit	9.7 lb.
Dark-green and deep-yellow vegetables	*0 6 lb.*
Citrus fruit	1.2 lb.
Milk, cream, cheese	4.4 qt.
Eggs	0 6 doz.
Meat, poultry, fish	4.2 lb.
Separated fats and oils	0.9 lb.
Sugars	1.4 lb.
Flour, cereals, baked goods	2.8 lb.

Fortunately, a gross guide is available in the surveys of household food consumption made by the U.S. Department of Agriculture (9). The latest one, made in the spring of 1955, covered a national sample of six thousand families. These surveys provide data on the quantities brought into the kitchen of some two hundred or more food items. The kind and average quantity of foods used have been summarized by Stiebeling (10) in Table 1. The nutrient evaluation by Stiebeling (10) indicates that these foods in these amounts meet or exceed the Recommended Dietary Allowances (11). As such, then, they serve to suggest a framework for the basic plan.

In the basic normal diet, which follows (Table 2), the amounts of the milk group, the meat group, and the vegetable and fruit group closely approximate the "average diet" given in Table 1. Fats and sweets have been considered separately, in order to permit modifica-

TABLE 2

Evaluation of a Basic Normal Diet for an Adult

(80 Gm Protein; 2,450 Calories)

Daily Food Intake	Quantity		Calories*	Foodstuffs			Minerals		Vitamins				
	Weight (Gm)	Approximate Measure		Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Ca (Gm)	Fe (Mg)	A (I U)	Ascorbic Acid (Mg)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Equivalent (Mg)
Milk, whole	488	1 pt	330	17	19	24	0.58	0.4	780	5	0.18	0.84	4.6
Egg	54	1 medium	75	6	6	Trace	0.03	1.3	550	.	0.05	0.14	1.8
Meat, poultry, fish, cooked, or cheese†	120	4 oz E P ‡	300	28	20		0.10§	3.8	6,610	4	0.27	0.74	10.8
Bread, whole grain or enriched white	180	6 slices	480	16	6	90	0.16	3.6			0.48	0.26	6.6
Cereal, whole grain or enriched	20	¾ cup	80	3	1	15	0.03	0.6			0.08	0.04	0.8
Potato, cooked	100	1 small	85	2		19	0.01	0.7	20	14	0.09	0.03	1.3
Vegetable, green or yellow∥	100	½ cup	30	2		5	0.09	1.3	6,280	30¶	0.08	0.15	1.3
Vegetable, other**	200	1 cup	50	2		10	0.06	1.0	450	30¶	0.09	0.10	1.0
Fruit, citrus††	100	1 serving	40	1		10	0.02	0.2	110	45	0.05	0.02	0.2
Fruit, other††		2 servings	80	1		20	0.03	0.9	1,905	35	0.08	0.09	0.9
Subtotal‡‡			1,550	78	52	193	1.11	13.8	16,705	163	1.45	2.41	20.3
Fats and oils§§ Sugar and sweets§§			900						660		.	...	.....
Total			2,450∥∥				1.11	13.8	17,365	163	1.45	2.41	20.3

* Calories have been rounded off to nearest 5

† Weighted on average food consumption data (except liver) If 2½ oz liver are not used weekly, the vitamin A value and asorbic acid must be discounted completely

‡ Edible portion

§ If 4 oz Cheddar type cheese are not used during a 10-day period, an additional 100 gm milk daily will supply equivalent calcium

∥ Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin spinach, turnip greens, and other greens

¶ For canned vegetables, reduce by one half

** Tomato—fresh, canned, or juice, vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage, and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower

†† Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values, as in Table 24

‡‡ Minerals, vitamins, and protein will approximate the Recommended Dietary Allowances (see Table 3) for a normal, physically active man weighing 70 kg or a physically active woman weighing 58 kg To meet additional caloric needs, further amounts of the above foods may be used, plus other sugars, starches, and fats (Tables 35, 36)

§§ Per capita fats and sweets available amount to approximately 2 oz separated fats and oils and 3 oz sugar per day From *Food Consumption and Dietary Levels of Households in the United States—Some Highlights from the Household Food Consumption Survey, Spring, 1955* (Agricultural Research Service, U S Department of Agriculture, ARS 62-2 [Washington· Government Printing Office, 1957], 0-433306)

∥∥ Caloric needs should be adjusted to individual needs The Recommended Dietary Allowances are leveled at moderate activity For variations in activity see pp. 194–95.

TABLE 2A

Description of the Daily Food Plan of Normal Diet

(80 Gm. Protein, 1,550–2,450 Calories; Derived from Table 2)

Daily Food Plan	Description
Milk Group	
1 pint*	*One pint whole milk* contains 330 calories, 17 gm. protein, calcium, phosphorus, and the B complex in important amounts. One pint buttermilk made from whole milk or ½ pint evaporated milk are similar.
	One pint skim milk contains 165 calories, 17 gm. protein, and important amounts of calcium, phosphorus, and the B complex. If completely skimmed, no fat will be present, accounting for the 50 per cent decrease in calories. One pint of buttermilk made from skim milk or ½–⅔ cup (depending on brand) of non-fat milk solids is similar.
Meat Group†	
5 meat equivalents	*One meat equivalent* is approximately equal to 1 oz (edible portion—weighed after cooking) beef, veal, lamb, pork, poultry, fish, cheese, or 1 egg. The five equivalents may be distributed throughout the day as desired. Liver and other variety meats are exceptional sources of vitamin A, iron, and the B complex. Four ounces of cooked meat may contain about 28 gm. protein and 300 calories.
Vegetable and Fruit Group	
6 servings	*A dark-green or deep-yellow vegetable* is important each day for its vitamin A value. Asparagus, green beans, broccoli, carrots, green pepper, winter squash, pumpkin, and other greens make up this group. Carrots, winter squash, and pumpkin may contain about 35 calories per serving. The others will be negligible.
	Other vegetables, as beets, cabbage, cauliflower, celery, cucumber, eggplant, lettuce, mushrooms, onions, peas, tomatoes, or turnips contribute varied amounts of all nutrients Beets, onions, peas, or turnips may contribute about 35 calories per ½-cup serving. Others will be negligible.
	Citrus fruit or other fruit rich in vitamin C is important each day. One orange or ½ cup juice, or ½ grapefruit or ½ cup juice, or 1 cup tomato juice or 1 cup strawberries or 1 cup red raspberries or ¼ cantaloupe or 1 large tangerine contains about 40 calories per serving and important amounts of vitamin C.

* 1 qt of milk during last trimester of pregnancy, 1½ qts of milk during lactation.

† If more meat is desired, 1 additional meat equivalent (edible portion—1 oz. cooked meat) may be substituted for 1 serving of the bread group without a significant change in calories *Other rearrangements* or omissions should be assessed by reference to Tables 2 and 3.

TABLE 2A—*Continued*

Daily Food Plan	Description
VEGETABLE AND FOOD GROUP—*Continued*	
6 servings—*Continued*	*Other fruits*, such as 1 apple or 1 peach or 1 pear or 2 prunes or 4 halves apricots or 12 grapes or ½ banana, contribute varied amounts of all nutrients and contain about 40 calories per serving. For other fruits see Table 24, p. 79, in text If sugar or syrup is added, additional calories must be calculated.
BREAD-CEREAL-POTATO-LEGUME GROUP	
8 servings	*One serving provides approximately 70 calories*, important amounts of the B complex, and iron. One serving is equal to 1 slice enriched or whole-wheat bread, ½ cup white potato, ¼ cup sweet potato, ½ cup corn, ½ cup cooked macaroni, noodles, spaghetti, rice, cornmeal, or ½ cup cooked dried beans or peas, ½ cup cooked cereal, or ¾ cup flake-type cereal or 2 graham crackers For other equivalents see Table 25, p 80
FATS AND SWEETS	
	Without this group the calories for the day approximate 1,385–1,550 (depending on whether skim milk is used) The 2 oz separated fats and oils and 3 oz sugar available per capita in the United States would add approximately 900 calories Adjustments to fit individual needs may be made as follows
	If one level teaspoon fat or oil is used on bread, in vegetables, or in cooking, about 45 calories may be added One thin slice crisp bacon, 2 tablespoons light cream or 1 tablespoon heavy cream, 1 teaspoon mayonnaise or oil, 1 tablespoon cream cheese or French dressing, or 5 small olives or 6 small nuts, also contain 45 calories each
	One level teaspoon sugar, jelly, or honey in cooking, on cereal, in fruit, or in coffee adds 20 calories One-half cup ice cream, pudding, or gelatin dessert may add between 150 and 300 calories, and one serving cake or pie between 300 and 700 calories (see Tables 35 and 36 for additional caloric values)
IODIZED SALT	
	Iodized salt should be used in regions where iodine is lacking Iodized salt is especially important in adolescence and pregnancy.

TABLE 2B

Menu Pattern and Sample Meals—Normal Diet for an Adult

(80 Gm Protein; 1,550–2,450 Calories; derived from Tables 2 and 2A)

Daily Food Plan*	Sample Menu Pattern*	Sample Meals*
	A.M.	
MILK GROUP 1 pint† MEAT GROUP 5 meat equivalents‡ One equivalent equals 1 oz. meat (edible portion) weighed after cooking	½ cup citrus fruit or juice 1 egg 1 cup cooked enriched or whole-grain cereal *or* 1½ cups flake-type cereal with milk and sugar§ 1 slice enriched or whole-grain toast with spread§ Coffee or tea, if desired, with sugar§ and milk	Orange juice 1 egg 1 cup farina with milk and sugar§ 1 slice toast with spread§ Coffee or tea if desired
	Noon	
VEGETABLE AND FRUIT GROUP 6 servings BREAD-CEREAL-POTATO-LEGUME GROUP 8 servings‡ FATS AND SWEETS§ (Without this group the calories are approximately 1,550)	2 oz. meat, poultry, fish, cheese, or 2 eggs‡ ½ cup potato or substitute Dark-green or deep-yellow vegetable Other vegetable Fruit 2 slices enriched or whole-grain bread or alternate* with spread§ 1 glass milk	Broiled chicken breast Baked potato Broccoli Tomato and lettuce salad Baked apple 2 small hot rolls 1 glass milk
	P.M.	
	2 oz. meat‡ or substitute, as at noon Vegetable Fruit Milk Enriched or whole-grain bread—2 slices or alternate* with spread§ Dessert§	Vegetable soup Sandwich—cheese and ham Lettuce wedge Sliced fresh peaches with ice cream§ Milk

* See Table 2A for alternates

† The use of 1 pt skim milk instead of 1 pt whole milk will reduce the calories by 165 One quart of milk should be used daily during last trimester of pregnancy and 1½ qt during lactation

‡ If 1 additional meat equivalent (1 oz E.P) is desired, 1 serving of the bread group may be omitted with no important change in the calories Other rearrangements or omissions should be reassessed by reference to Table 2

tional caloric values)

tion in calories, fat, and carbohydrate for various therapeutic purposes. A nutrient evaluation of the basic normal diet for the adult appears in Table 2, a daily food plan and description of the food groups in Table 2A, and a menu pattern and sample meals in Table 2B.

In setting up this guide for normal diet, it is intended only that this pattern of eating be regarded as a framework within which basic foods may be selected in the proper amounts and with a wide variety of choice. It is not to be inferred that an individual must use this exact allotment of foods. However, if omissions or changes are made in the food groups, a reassessment of nutrient content should be made.

REFERENCES

1. WIDDOWSON, E. M., and MCCANCE, R. A. Food tables, Lancet, 1:230–32, 1943
2. BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS in co-operation with the NATIONAL RESEARCH COUNCIL. Tables of food composition in terms of eleven nutrients ("U.S Department of Agriculture, Miscellaneous Publications," No. 572.) 1945
3 FOOD AND AGRICULTURE ORGANIZATION, NUTRITION DIVISION. Energy-yielding components of food and computation of calorie values. 1947.
4. MERRILL, A. L, and WATT, B. K Energy value of foods—basis and derivation. ("Agricultural Research Service, U S. Department of Agriculture, Handbooks," No. 74) March, 1955
5. LEICHSENRING, J. M., and WILSON, E D. Food composition table for short method of dietary analysis (2d rev.), J Am. Dietet. A., 27:386–89, 1951.
6. HAYES, O., TRULSON, M F., and STARE, F. J Suggested revisions of the Basic 7, J. Am Dietet. A, 31:1103–7, 1955
7. CASO, E K. Calculation of diabetic diets, J Am Dietet A, 26:575–83, 1950.
8. LEVERTON, R. M, and ODELL, G V The nutritive value of cooked meat. (Miscellaneous Publication MP-49, Oklahoma Agricultural Experiment Station, Oklahoma State University) 1958.
9. Household Food Consumption Survey, 1955 ("U S Department of Agriculture, Agricultural Research Service Reports," Nos 1–10) 1957.
10. STIEBELING, H. K. Food and nutrient consumption trends and consumer problems: talk at American Institute of Nutrition, Chicago. (U S Department of Agriculture, Agricultural Reserach Service, Mimeo) 1957.
11. FOOD AND NUTRITION BOARD, NATIONAL RESEARCH COUNCIL. Recommended dietary allowances, revised, 1958 ("NAS-NRC Publications," No 589)

Chapter 2

Correlation of Basic Diet with "Recommended Dietary Allowances"

The next step will be to compare the plan of diet with the nutritional needs of the individual. A guide to the nutrient needs of healthy individuals has been published by the Food and Nutrition Board of the National Research Council, covering individuals from infancy to old age. This guide, *Recommended Dietary Allowances*, has a distinct advantage, in that it covers not only the so-called average needs but also those needs which approach the upper level of "normality." The recently revised recommendations (1958) appear in Table 3. The notes and excerpts accompanying this table have been taken from the National Academy of Science, National Research Council, Publication No. 589 (1958).

RECOMMENDED DIETARY ALLOWANCES

(Revised 1958)

PURPOSES AND INTENDED USES

In 1940 the Food and Nutrition Board accepted an assignment from the National Defense Advisory Commission to recommend a formulation of nutrient allowances for daily consumption which would be adequate for maintenance of good nutrition in essentially all the population of the United States. The title "Recommended Dietary Allowances" was selected for this standard in the effort to make it clear that the levels of nutrient intake recommended were judgments which were not to be considered final and which should be re-evaluated periodically as new information became available. Moreover, the use of this term was meant to avoid misinterpretation of the allowances as representing either minimal or optimal nutrient requirements.

Recommended Dietary Allowances was published in a first edition in 1943 (2), and revisions were provided in 1945 (3), 1948 (4), and 1953 (5). In the present

TABLE 3

FOOD AND NUTRITION BOARD, NATIONAL RESEARCH COUNCIL RECOMMENDED DAILY DIETARY ALLOWANCES,* REVISED 1958 (1)

Designed for the maintenance of good nutrition of healthy persons in the U.S A.
(Allowances are intended for persons normally active in a temperate climate.)

AGE AND SEX	WEIGHT	HEIGHT	CALORIES†	PROTEIN	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN EQUIVALENT‡	ASCORBIC ACID	VITAMIN D
ADULTS												
	kg (lb)	cm (in)		gm	gm.	mg	I U	mg.	mg	mg. equivalents	mg.	I.U.
Men												
25 years	70(154)	175(69)	3200	70	0 8	10	5000	1 6	1 8	21	75	
45 years	70(154)	175(69)	3000	70	0 8	10	5000	1 5	1 8	20	75	
65 years	70(154)	175(69)	2550	70	0 8	10	5000	1 3	1 8	18	75	
Women												
25 years	58(128)	163(64)	2300	58	0 8	12	5000	1 2	1 5	17	70	
45 years	58(128)	163(64)	2200	58	0 8	12	5000	1 1	1.5	17	70	
65 years	58(128)	163(64)	1800	58	0 8	12	5000	1 0	1 5	17	70	
Pregnancy (2d half)			+ 300	+20	1 5	15	6000	1 3	2 0	+3	100	400
Lactation (850 ml milk daily)			+1000	+40	2 0	15	8000	1 7	2 5	+2	150	400

* The allowance levels are intended to cover variations among most normal persons as they live in the United States under usual environmental stresses. The recommended allowances can be attained with a variety of common foods, providing other nutrients for which human requirements have been less well defined. See text of Publication No 389 (1) *for more detailed discussion of allowances and of nutrients not tabulated*

† Calorie allowances apply to individuals usually engaged in moderate physical activity. For office workers or others in sedentary occupations, they are excessive. Adjustments must be made for variations in body size, age, physical activity and environmental temperature

‡ Niacin equivalents include dietary sources of the preformed vitamin and the precursor, tryptophan, 60 mg. tryptophan is counted as being equivalent to 1 mg niacin

TABLE 3—*Continued*

AGE AND SEX	WEIGHT	HEIGHT	CALORIES†	PROTEIN	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN EQUIVALENT‡	ASCORBIC ACID	VITAMIN D
CHILDREN UP TO TWELVE YEARS												
	kg (lb.)	cm (in)		gm.	gm.	mg.	I.U.	mg.	mg.	mg. equivalents	mg.	I.U.
Infants§												
0 to 1 month												
2 to 6 months	6(13)	60(24)	kg.×120	See Footnote§	0.6	5	1500	0.4	0.5	6	30	400
7 to 12 months	9(20)	70(28)	kg ×100		0.8	7	1500	0.5	0.8	7	30	400
1 to 3 years	12(27)	87(34)	1300	40	1.0	7	2000	0.7	1.0	8	35	400
4 to 6 years	18(40)	109(43)	1700	50	1.0	8	2500	0.9	1.3	11	50	400
7 to 9 years	27(60)	129(51)	2100	60	1.0	10	3500	1.1	1.5	14	60	400
10 to 12 years	36(79)	144(57)	2500	70	1.2	12	4500	1.3	1.8	17	75	400
CHILDREN THIRTEEN TO NINETEEN YEARS												
Boys												
13 to 15 years	49(108)	163(64)	3100	85	1.4	15	5000	1.6	2.1	21	90	400
16 to 19 years	63(139)	175(69)	3600	100	1.4	15	5000	1.8	2.5	25	100	400
Girls												
13 to 15 years	49(108)	160(63)	2600	80	1.3	15	5000	1.3	2.0	17	80	400
16 to 19 years	54(120)	162(64)	2400	75	1.3	15	5000	1.2	1.9	16	80	400

§ See text of Publication No 589 (1) for discussion of infant allowances The Board recognizes that human milk is the natural food for infants and feels that this is the best and desired procedure for meeting nutrient requirements in the first months of life No allowances are stated for the first month of life Breast feeding is particularly indicated during the first month when infants show handicaps in ... ent rates of maturation of digestive, excretory, and endocrine functions Recommendations as listed pertain to nutrient intake as afforded by cow's milk formulas and supplementary foods given the infant when breast fe... ...rminated Allowances are

revision the previously described purposes and bases of the allowances are reaffirmed

These allowances are designed to maintain good nutrition in healthy persons in the United States under current conditions of living and to cover nearly all variations of requirements for nutrients in the population at large. They are meant to afford a margin of sufficiency above minimal requirements and are therefore planned to provide a buffer against the added needs of various stresses and to make possible other potential improvements of growth and function. The allowances are not to be considered adequate to meet the additional requirement associated with disease or for nutrient repletion in severely depleted persons On the other hand, they may be more generous than would be practical for feeding large groups under conditions of limited food supply or economic stringency. The margin of sufficiency above minimal requirements varies widely among the single nutrients listed. This occurs because of relative differences in storage capacity in the body, in the range of requirement among individuals, in the difficulty of assessing precise requirements, and in possible hazards of excessive intake between the essential nutrients Information available is not adequate to permit designation of these as optimal levels of intake

Patterns of food consumption in the United States permit ready adaptation and compliance with the recommendations (8) They have been widely used for planning diets and food supplies for groups It should be realized, however, that, in using this standard for evaluation of diets, it cannot be assumed that food practices are necessarily poor or malnutrition exists because these higher goals of nutrient intake are not completely met As applied to individuals, the allowances can serve as a point of reference, and deviations should be interpreted only in terms of the total observation of the individual's nutritional status.

The different objectives of national food standards should be noted. For instance, the Canadian standard seeks to establish "a nutritional floor beneath which maintenance of health of the people cannot be assumed" and of necessity, therefore, approaches minimal nutrient requirements (6) The British standard aims at maintenance of good nutrition in the average person (6), while the United States allowances are intended to provide for maintenance of good nutrition in not only the average person but in substantially all normal persons.

This revision of *Recommended Dietary Allowances* includes changes in the "reference" individuals and in the manner of expression of allowances for niacin Other less important adaptations have been made as well

SCIENTIFIC BASES FOR THE RECOMMENDED ALLOWANCES

Calories.—Food energy must be afforded the body to meet the needs of basal metabolism, building and replacement of body tissues, specific dynamic activity of food, excretory losses, and physical activity Calorie allowances have been established in all previous editions of *Recommended Dietary Allowances* with the objective of provision of energy in amounts sufficient, when consumed over an extended period, to maintain body weight or rates of growth at levels most conducive to well-being and health.

In specifying requirements for calories for individuals, the device of the "reference" man and woman, both aged twenty-five and living in a temperate climate with a mean annual external temperature of 20° C. is used. The weight of the "reference" man is given as [illegible] kilograms, and the "reference" woman is

described as weighing 58 kilograms. Both the man and the woman are presumed to lead a vigorous, healthy life and to be *moderately active physically*, with occupations which could not be described either as sedentary or as hard physical labor. The man would be likely to be in light industry or employed as delivery man, painter, or outdoor salesman. The woman might be homemaker, saleswoman, or bench worker in a factory. The daily allowance as derived for the "reference" man is 3,200 calories and for the "reference" woman is 2,300 calories. In these recommendations the calorie allowances for adults pertain

woman. Table 4 may be used as a guide. Heights and weights as recorded in-

TABLE 4*

DESIRABLE WEIGHT FOR HEIGHT

Height (Inches)	Weight in Pounds	
	Men	Women
58	. .	112±11
60	125±13	116±12
62	130±13	121±12
64	135±14	128±13
66	142±14	135±14
68	150±15	142±14
70	158±16	150±15
72	167±17	158±16
74	187±18	. . . .

clude clothing usually worn indoors and shoes with one-inch heels. Table 5 may be used in making adaptations of calorie allowances for various body weights and ages.

Adjustment for climate.—Standard conditions for estimating calorie allowances include mean *environmental temperature* of 20° C. rather than 10° C. as established by the FAO committee It seems probable that most persons in the United States live in an environment with a mean temperature of approximately 20° C. Most are protected against the effects of cold by warm clothes, central heating, and heated means of transportation. Many also live and work in air-conditioned atmospheres so that the effects of high temperatures are partially but not so completely ameliorated.

If the external temperature varies widely from the standard, corrections in calorie allowances may be made For lower temperatures there is need for an increase in allowances. To accomplish this, the allowances should be increased by 5 per cent for the first 10° C. decrease from the standard of 20° C. and by

3 per cent for each additional 10° decrease. Similarly, allowances should be reduced for high environmental temperatures, with a reduction of 5 per cent for each increase of 10° C. above the standard temperature.

These adjustments are devised for application to differences in mean annual temperature, but they may well serve for adjustment to seasonal differences as well. In various parts of the United States the difference in mean winter and summer temperatures may range from 10° to 30° C. This would indicate corrections of from 5 to 15 per cent in the calorie allowances according to conditions. It should be observed that all adjustments for climate presuppose an ordinary amount of actual exposure to the climate. For persons spending most of their time out of doors, these adjustments may be insufficient, particularly during [illegible]

TABLE 5

CALORIE ALLOWANCES FOR INDIVIDUALS OF VARIOUS BODY WEIGHTS AND AGE

(At Mean Environmental Temperature of 20° C. and Assuming Moderate Physical Activity)

Desirable Weight		Calorie Allowances		
Kilograms	Pounds	25 years	45 years	65 years
		Men		
50	110	2,500	2,350	1,950
55	121	2,700	2,550	2,150
60	132	2,850	2,700	2,250
65	143	3,000	2,800	2,350
70	154	3,200	3,000	2,550
75	165	3,400	3,200	2,700
80	176	3,550	3,350	2,800
85	187	3,700	3,500	2,900
		Women		
40	88	1,750	1,650	1,400
45	99	1,900	1,800	1,500
50	110	2,050	1,950	1,600
55	121	2,200	2,050	1,750
58	128	2,300	2,200	1,800
60	132	2,350	2,200	1,850
65	143	2,500	2,350	2,000
70	154	2,600	2,450	2,050
75 ..	165	2,750	2,600	2,150

* For additional information covering energy expenditure as it relates to various degrees of activity see Appendix A, p. 154

Protein, minerals, and vitamins.—The bases for the selection of values in these categories have been discussed in some detail in the original publication (National Academy of Science, National Research Council, Publication No. 589 [1958]).

Niacin equivalent.—The greatest change over previous publications has been in the use of the term "niacin equivalent" and the selection of a value for each age group. These allowances have been calculated by assuming that 60 mg. tryptophan may be converted to 1 mg. niacin. Horwitt (7) has discussed the development of the niacin-equivalent concept and the practical application of this concept to the calculation of dietaries.

Allowances have been calculated by estimating requirements on the basis of both body weight and caloric intake and increasing the higher allowance by 50 per cent. In view of the many uncertainties, it was felt that such an increase seemed desirable. It should provide for differences in requirement among individuals under varying physiologic or dietary situations.

Allowances for infants are based on the studies of Holt (9) and on estimates of the niacin equivalents furnished by human milk.

Allowances for pregnancy and lactation are increased in accordance with the recommended increase in caloric intake, using 4.4 niacin equivalents for each 1,000 calories added to the diet. This amount was further increased by a factor of 50 per cent for reasons given above.

The tryptophan content of the normal diet for the adult (Table 2) totals over 800 mg. Assuming that 60 mg. tryptophan may be converted to 1 mg. niacin, approximately 14 mg. niacin equivalents may be derived in this way. By adding this to the 15 mg. niacin in the diet, a total of 29 mg. niacin equivalents may be estimated.

Since the dietary patterns outlined in the *Handbook* contain at least this amount and sometimes more where larger quantities of milk and eggs are indicated, it may be expected that the levels indicated in the *Recommended Dietary Allowances* have been met.

REFERENCES

1. Food and Nutrition Board, National Research Council. Recommended dietary allowances, revised, 1958 ("NAS-NRC Publications," No. 589)
2. National Research Council. Recommended dietary allowances. ("National Research Council Reprint and Circular Series," No. 115.) 1943.

3. ———. Recommended dietary allowances, revised, 1945 ("National Research Council Reprint and Circular Series," No. 122.)
4. ———. Recommended dietary allowances, revised, 1948 ("National Research Council Reprint and Circular Series," No. 129)
5. ——— Recommended dietary allowances, revised, 1953. ("National Research Council Reprint and Circular Series," No 302.)
6. PETT, L. B. Limitations in the use of dietary standards: differences in American, British and Canadian standards, J. Am. Dietet. A., 27:28–31, 1951.
7. HORWITT, M. K. Niacin-tryptophan requirements of man, J. Am. Dietet. A., 34:914–19, 1958.
8. Household Food Consumption Survey, 1955. ("U.S. Department of Agriculture, Agricultural Research Service Reports," Nos. 1–10) 1957.
9. HOLT, L. E, JR. The adolescence of nutrition, Arch. Dis. Child, 31:427–38, 1956.

Chapter 3 | *Modification of Basic Diet at Various Phases of Life*

DIET DURING PREGNANCY AND LACTATION

There is an increased need above the normal maintenance allowances for protein, minerals, vitamins, and calories for use during pregnancy and lactation (see Table 3, from *Recommended Dietary Allowances, Revised, 1958*)

During pregnancy it has been estimated that an additional 40,000 calories will be needed for the entire period (1). The increased energy cost involved in building new tissue for the fetus and the placenta, as well as the increased work load associated with movement and the increase in basal metabolic rate, must be considered. It has been assumed that the increased need will be small in the first half of pregnancy and might be compensated for by decreased activity. In the latter half of pregnancy, an increase of 300 calories per day may be needed. The suitability of these recommendations depends in large part upon the nutritional status upon entering pregnancy, the age of the woman, and the activity during pregnancy. Under any circumstance, the selection of a dietary program should be made in co-operation with a physician and nutritionist.

The caloric requirements of lactation will depend upon the quantity of milk produced and the energy expended in daily activities. It has been recommended (1) that the diet be supplemented by approximately 130 calories per 100 cc. milk produced. For example, if 850 cc. milk are being produced, an additional 1,000 calories per day will be needed.

Protein increases are also indicated to provide for the growth of

the fetus and adenexa in pregnancy, the greatest demands occurring during the latter half of pregnancy. The recommendation (1) indicates 20 gm. daily in addition to the 1 gm. protein per kilogram of body weight recommended for normal maintenance needs. During lactation, protein is required in amounts necessary to meet the needs of milk production. A supplement of 40 gm. daily has been recommended for the lactating woman (1). A corresponding increase in minerals and vitamins has also been indicated.

These recommendations for supplementation may be met by adding 1 pint of milk and 1 meat equivalent to the normal diet (Table 2) during pregnancy and 1 quart of milk during lactation, thus bringing the milk intake during pregnancy to 1 quart daily and to 1½ quarts during lactation. If the milk is not fortified with 400 I.U. vitamin D per quart, an additional supplement will be prescribed by the physician.

With proper adjustment in the milk and meat intake, a daily food plan may be derived from Table 2A A menu pattern and sample meals are illustrated in Table 2B. Table 7A is also appropriately used in pregnancy.

DIETS DURING CHILDHOOD AND ADOLESCENCE

Relatively more calories, protein, minerals, and vitamins are recommended per unit of weight during the growth period.

A wide range of normality exists in the developmental pattern. Data on heights and weights of children and youth in the United States have been compiled by Hathaway (2) The compilation includes general tables giving height-weight data from research studies on children and youth from thirty-four states and the District of Columbia, height-weight standards used in appraisal of growth and nutritional status, special tables relating height-weight-age data to some factors affecting growth patterns, and an annotated list of references, which furnishes pertinent details of methodology and supplementary information concerning the studies from which data have been quoted Mean figures indicating height and weight appear in Table 3 (Recommended Dietary Allowances) (p. 14). Average weight for height tables from birth to school age, prepared by Woodbury, appear in Appendix IX, Table 50, p 190.

No recommendations have been made in *Recommended Dietary*

Allowances (1) for the first month of life, when breast feeding is indicated and calorie allowances for the mother are applicable. After the first month, allowances have been set according to the general pattern of intake of thriving infants and are 120 calories per kilogram for one to six months, inclusive, and 100 calories per kilogram for seven to twelve months, inclusive. The underweight infant may benefit from a larger allowance. These allowances would be provided by about 1,000 ml. of human milk for the two- to six-month period.

After one year there are also wide individual variations in physical activity in children. Consumption studies of small groups have revealed a range of intake with a standard deviation of 30 per cent of the mean and with extreme variations, particularly with athletic children in whom deviations may be even greater (1). At the other end of the activity scale it has been shown that inactive children may become obese even when the caloric intake is well below the figures given in *Recommended Dietary Allowances.* In dealing with feeding problems of children, account should be taken of activity as well as size and age.

While the relative amounts of each food consumed will vary during the child's developmental period, the actual food selection will be similar to that outlined in the basic dietary patterns. For example, the Recommended Daily Allowances for protein indicate a variation in protein between 40 and 100 gm., depending upon the age and size of the child In younger children the 34 gm. protein provided in 1 quart of milk will insure a surplus of animal protein. With 1 egg and 1 oz. meat in addition, it will be possible to provide two-thirds of the protein as animal protein in a diet including 65 gm. of protein daily.

A combination of foods used by a child between four and six years of age might approximate that given in Table 6. A "Daily Food Plan" is indicated in terms of the various food groups, and "Menu Pattern" and "Sample Meals" have been illustrated in Table 6A. The nutrient evaluation of this plan, shown in Table 6, meets or exceeds the *Recommended Dietary Allowances, 1958* (Table 3).

It is not intended that all children should conform to this precise pattern of eating. However, if any omissions or gross changes in the plan of eating are made, it would be desirable to reassess the nutrient content of the diet by reference to Table 6.

A "Menu Pattern" and "Sample Meals" for an adolescent be-

Daily Food Intake	Quantity		Calories*	Foodstuffs			Minerals		Vitamins				
	Weight (Gm)	Approximate Measure		Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Ca (Gm)	Fe (Mg)	A (I U)	Ascorbic Acid (Mg)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Equivalent (Mg)
Milk, whole†	976	1 qt	660	34	38	48	1 16	0 8	1,560	10	0 36	1 68	9 2
Egg	54	1 medium	75	6	6	Trace	0 03	1 3	550	..	0 05	0 14	1 8
Meat, poultry, fish, cooked, or cheese‡	60	2 oz E P	150	14	10		0 05§	1 9	3,305	2	0 14	0 37	5.4
Bread, whole grain or enriched white	90	3 slices	240	8	3	45	0 08	1 8	.	.	0 24	0.13	3.3
Cereal, whole grain or enriched	20	¾ cup	80	3	1	15	0 03	0 6		..	0 08	0 04	0 8
Potato, cooked	100	1 small	85	2		19	0 01	0 7	20	14	0 09	0 03	1.3
Vegetable, green or yellow‖	100	½ cup	30	2		5	0 09	1 3	6,280	30#	0.08	0 15	1 3
Vegetable, other**	100	½ cup	25	1		5	0 03	0 5	225	15#	0 05	0 05	0 5
Fruit, citrus	100	1 serving††	40	1		10	0 02	0 2	110	45	0 05	0.02	0.2
Fruit, other		1 serving††	40	1		10	0 02	0 5	950	18	0 04	0 05	0 5
Subtotal‡‡			1,425	72	58	157	1 52	9 6	13,000	134	1.18	2 66	24 3
Separated fats and sweets§§			305				...	.	330	.	......	....	....
Vitamin D concentrate‖‖										. ..	. .	......	....
Total..			1,730	72			1 52	9 6	13,330	134	1 18	2.66	24 3

* Calories have been rounded off to nearest 5

† Milk equivalents may be noted in Table 26

‡ Based on average food consumption data (except liver) If 2½ oz liver are not used during a weekly period, the vitamin A value and ascorbic acid must be discounted completely

§ The calcium value depends almost entirely upon the average use of 60 gm Cheddar type cheese during a 10-day period An additional 50 gm milk daily will provide equivalent calcium

‖ Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, spinach, turnip greens, and other greens

For canned vegetables, reduce by one half

cucumber, lettuce, and cabbage, and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower

†† Portion sizes of all fruits have been adjusted to provide equivalent carbohydrate and calorie values, as in Table 24

‡‡ The mineral, vitamin, and protein content of this diet meets or exceeds the Recommended Dietary Allowances (Table 3) for the normal child of this age To meet additional caloric needs, further amounts of the above foods may be used and/or other sugars, starches, and fats (see Tables 35 and 36)

§§ 5 teaspoons fat or oil would supply approximately 225 calories 4 teaspoons sugar, jelly, or honey would add approximately 80 calories to the basic diet.

‖‖ 400–800 I U. vitamin D may be obtained from fortified milk or a concentrate.

TABLE 6A

Menu Pattern and Sample Meals for Child between Four and Six Years of Age

(70 Gm. Protein; 1,730 Calories; Derived from Table 6)

Daily Food Plan*	Sample Menu Pattern*	Sample Meals*
Milk Group 1 qt. milk	*A.M.*	
Meat Group 3 equivalents† (*One equivalent is* equal to 1 oz cooked beef, veal, pork, lamb, liver, poultry, fish, cheese or one egg)	1 citrus fruit or ½ cup juice ½ cup cereal with milk and sugar‡ 1 slice toast with spread‡	Orange juice Enriched farina with milk and sugar‡ Toast with spread
	Noon	
Vegetable and Fruit Group 4 servings (see Table 2A) *A dark-green or deep-yellow* vegetable is important for vitamin A *A citrus fruit* or other fruit rich in vitamin C is important daily	2 oz. meat, poultry, fish, cheese or 2 eggs ½ cup potato or substitute Dark-green or deep-yellow vegetable *Dessert‡* 1 slice enriched or whole-grain bread with spread‡ Milk	Broiled ground beef Baked potato Carrot rings Ice cream Bread with spread‡ *Milk*
Bread-Cereal-Potato-Legume Group 5 servings	*P.M.*	
Fats and Sweets (*Without this group* the diet contains 1,425 calories) 5 teaspoons fat or oil add 225 calories 4 teaspoons sugar, jelly, or honey add 80 calories	1 egg or 1 oz. cheese, meat, poultry, or fish *Vegetables, raw or cooked* Fruit 1 slice enriched or whole-grain bread with spread‡	Liver in tomato sauce Shredded lettuce Baked apple Bread with spread‡ Milk
	Between	
	Milk	Milk

* For alternates within each food group see Table 2A

[illegible] one serving of bread group (as 1 slice bread) may be omitted for [illegible]

TABLE 7—Nutritive Content of Diet for an Adolescent between Twelve and Fifteen Years of Age
(Protein 100 Gm, Calories 1,875–2,525)

Daily Food Intake	Quantity: Weight (Gm)	Quantity: Approximate Measure	Calories*	Foodstuffs: Protein (Gm)	Foodstuffs: Fat (Gm)	Foodstuffs: Carbohydrate (Gm)	Minerals: Ca (Gm)	Minerals: Fe (Mg)	Vitamins: A (I U)	Vitamins: Ascorbic Acid (Mg)	Vitamins: Thiamine (Mg)	Vitamins: Riboflavin (Mg)	Vitamins: Niacin Equivalent (Mg)
Milk, whole†	976	1 qt	660	34	38	48	1.16	0.8	1,560	10	0.36	1.68	9.2
Eggs	108	2 medium	150	12	12	Trace	0.06	2.6	1,100	.	0.10	0.28	3.6
Meat, poultry, fish, cooked, or cheese‡	120	4 oz E P	300	28	20		0.10§	3.8	6,610	4	0.27	0.74	10.8
Bread, whole grain or enriched white	150	5 slices	400	14	5	75	0.13	3.0		...	0.40	0.21	5.5
Cereal, whole grain or enriched	20	¾ cup	80	3	1	15	0.03	0.6	.	...	0.08	0.04	0.8
Potato, cooked	100	1 small	85	2		19	0.01	0.7	20	14	0.09	0.03	1.3
Vegetable, green or yellow‖	100	½ cup	30	2		5	0.09	1.3	6,280	30#	0.08	0.15	1.3
Vegetable, other**	200	1 cup	50	2		10	0.06	1.0	450	30#	0.09	0.10	1.0
Fruit, citrus	100	1 serving††	40	1		10	0.02	0.2	110	45	0.05	0.02	0.2
Fruit, other		2 servings††	80	1		20	0.03	0.9	1,905	35	0.08	0.09	1.0
Subtotal‡‡			1,875	99	76	202	1.69	14.9	18,035	168	1.60	3.34	34.7
Vitamin D concentrate§§										....	......	....	....
Separated fats and sweets ‖‖			650						890	..	......	..	..
Total			2,525				1.69	14.9	18,925	168	1.60	3.34	34.7

* Calories have been rounded off to nearest 5

† Milk equivalents may be noted in Table 26

‡ Based on average food consumption data (except liver) If 2½ oz of liver are not used during a weekly period, the vitamin A value and ascorbic acid must be discounted entirely

§ The calcium value depends almost entirely upon the average use of 120 gm Cheddar type cheese during a 10 day period An additional 100 gm milk daily will provide equivalent calcium

‖ Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, spinach, turnip greens, and other greens

\# For canned vegetables, reduce by one half

** Tomato—fresh, canned, or juice, vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage, and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower.

†† Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values, as in Table 24

‡‡ *The mineral, vitamin, and protein content of this diet meets or exceeds the Recommended Dietary Allowances Revised, 1958* (Table 3) for a normal adolescent To meet additional caloric needs, further amounts of the above foods may be used and/or other sugars, starches, and fats (see Tables 35 and 36)

§§ 400–800 I U vitamin D may be obtained from fortified milk or a concentrate.

‖‖ 10 teaspoons fat or oil in cooking, on potato or vegetables, or on bread contain approximately 450 calories 10 teaspoons sugar in cooking, in cereal, in dessert, or on fruit will contain approximately 200 calories Adjustments in this group should be made to suit individual caloric needs

TABLE 7A*

Menu Pattern and Sample Meals for an Adolescent between Twelve and Fifteen Years of Age

(100 Gm. Protein and 1,875–2,525 Calories,† Derived from Table 7)

<table>
<tr><th>Daily Food Plan‡</th><th>Sample Menu Pattern‡</th><th>Sample Meals‡</th></tr>
<tr><td rowspan="8">

Milk Group

1 qt milk

Meat Group

6 equivalents§
(*One equivalent equals* 1 oz cooked beef, veal, lamb, poultry, fish, cheese or 1 egg)

Vegetable and Fruit Group

6 servings
A dark-green or deep-yellow vegetable daily for vitamin A value
A citrus fruit or other fruit rich in vitamin C daily

Bread-Cereal-Potato-Legume Group

7 servings

Fats and Sweets

(*Without this group* the diet contains 1,875 calories)
10 teaspoons fat or oil contain 450 calories
10 teaspoons sugar, jelly, or honey contain 200 calories

</td><td colspan="2">A.M.</td></tr>
<tr><td>1 citrus fruit or ½ cup juice
½ cup cooked cereal or ¾ cup flake-type with milk and sugar†
1 slice enriched or whole-grain toast with spread†
Milk</td><td>½ grapefruit
¾ cup flakes with milk and sugar†
1 slice toast with spread†
Milk</td></tr>
<tr><td colspan="2">Noon</td></tr>
<tr><td>2 oz. meat, poultry, fish, cheese or 2 eggs
Vegetable
2 slices enriched or whole-grain bread or substitute
Fruit
1 glass milk</td><td>Sandwich.
2 slices meat
2 slices bread

Sliced tomatoes
1 apple
1 glass milk</td></tr>
<tr><td colspan="2">P.M.</td></tr>
<tr><td>4 oz. meat, poultry, fish, or substitute
½ cup potato or substitute
Dark-green or deep-yellow vegetable
Other vegetable
Fruit
2 slices enriched or whole-grain bread with spread† or substitute
Milk</td><td>Meat loaf
Baked potato
Asparagus tips
Cabbage slaw
Fresh strawberries
2 hot rolls with spread†
Milk</td></tr>
<tr><td colspan="2">Between</td></tr>
<tr><td>Milk</td><td>Milk</td></tr>
</table>

TABLE 8

Menu Pattern and Sample Meals for Individual Sixty-five Years or Over

(80 Gm Protein; 1,550–1,750 Calories; Derived from Table 2)

Daily Food Plan	Sample Menu Pattern	Sample Meals
	A M	
Milk Group 1 pint milk **Meat Group** 5 equivalents (*One equivalent equals* 1 oz edible portion of cooked beef, veal, lamb, poultry, fish, cheese or 1 egg)	1 citrus gruit or ½ cup juice ½ cup cooked cereal or ¾ cup flake-type cereal with milk and sugar* 1 slice enriched or whole-grain toast with spread* Coffee or tea if desired*	½ cup orange juice ¾ cup flake-type cereal with milk and sugar* Toast with spread* Coffee or tea if desired*
	Noon	
Vegetable and Fruit Group 6 servings *A dark-green or deep-yellow* vegetable is important for vitamin A value *A citrus fruit* or other fruit rich in vitamin C is important daily	Meat, poultry, fish, or cheese (3 oz edible portion) ½ cup potato or substitute† Dark-green or yellow vegetable Fruit 1 slice enriched or whole-grain bread with spread* Milk	Browned meat pattie Baked potato Broccoli Tossed lettuce and tomato salad* Applesauce Bread with spread* Milk
	P M	
Bread-Cereal-Potato-Legume Group 8 servings **Fats and Sweets** (*Without this group* the diet contains 1,550 calories) 3 teaspoons fat or oil add 135 calories 3 teaspoons sugar, jelly, or honey add 60 calories	2 oz edible portion of meat, poultry, fish, cheese or 2 eggs ½ cup potato, or rice, or substitute† Vegetables Fruit 2 slices enriched or whole-grain bread or substitute† Milk	Vegetable soup with crackers† Tuna casserole† Mixed salad greens* Peach custard* 1 slice bread with spread*
	Between	**Bedtime**
	Milk 2 Graham crackers†	Milk 2 Graham crackers†

tween twelve and fifteen years of age are outlined in Table 7A. If any omissions or gross changes are made in this plan, a reassessment may be made by reference to Table 7.

DIETS AFTER SIXTY-FIVE YEARS OF AGE

Caloric requirements decline progressively after the years of early adulthood, because of a decrease in basal metabolic rate as well as lessened physical activity (1).

The *Recommended Dietary Allowances, Revised, 1958* (1), indicate a reduction in calories of 3 per cent per decade between the ages of thirty and fifty and 7.5 per cent per decade from age fifty to seventy. Thus caloric allowances are 21 per cent less at age sixty-five. Values between 1,800 and 2,250 calories are given in the *Recommended Allowances*, depending upon the individual.

Protein, minerals, and vitamins remain at the levels recommended for the young adult. For this purpose, the four food groups outlined in the "Daily Food Plan of Normal Diet for the Adult" (Table 2) will be appropriate. In this way, approximately 1,550 calories will be provided, and protein, minerals, and vitamins will meet or exceed the allowances. A suitable number of additional calories, to fit individual needs, may be obtained to the greatest nutritional advantage by appropriate increases in these four food groups. However, added fats and oils or sugar and sweets may be used if desired. Caloric values may be noted from Tables 2 and 2A and from 35 and 36

A description of the food groups and the amounts to be used appear in Table 2A. A sample menu pattern and sample meals for the day appear in Table 8. Nutrient evaluation may be made by reference to Table 2.

Special leaflets for use in homes feeding the aged or for use by older individuals may be obtained from The American Dietetic Association, 620 North Michigan Avenue, Chicago, Illinois.

REFERENCES

1. Food and Nutrition Board, National Research Council. Recommended dietary allowances, revised, 1958. ("NAS-NRC Publications," No. 589.)
2. Hathaway, M. L. Heights and weights of children and youth in the United States ("U.S. Department of Agriculture Home Economics Research Reports," No. 2.) 1957.

SECTION II | MODIFICATIONS OF THE NORMAL DIET

As stated previously, the aim of the normal dietary regimen is to maintain, or bring the patient to, a state of nutritive efficiency. If, in illness, deterioration has occurred in the digestive or metabolic processes or in the utilization of nutrients, nutritional needs may increase. On the other hand, there are instances in which a decrease is indicated, as in sodium or calories. In such instances, *all other* nutrients should remain at or above the needs for nutritive efficiency. From this it is logical to assume that a therapeutic diet may be regarded as a modification of the normal diet. With this principle in mind, two basic guides will be called for, from which appropriate adaptations may be made: first, a guide to the recommended nutrient allowances for healthy individuals and, second, a plan of eating which will meet these needs. Appropriate adaptations may then be made from this to suit the special purposes of therapeutic diets.

Recently a revision of a guide to the nutrient needs of healthy individuals has been prepared by the Food and Nutrition Board of the National Research Council, covering individuals from infancy to old age. This guide, called *Recommended Dietary Allowances, Revised, 1958* (11) has been reproduced and discussed on pages 12–19 in the text.

The next step will be to develop a flexible plan of eating which will approximate this level of nutrient content. To achieve this goal as concisely as possible, a basic daily pattern of diet has been outlined simply, in terms of commonly used and available food groups. For

tween twelve and fifteen years of age are outlined in Table 7A. If any omissions or gross changes are made in this plan, a reassessment may be made by reference to Table 7.

DIETS AFTER SIXTY-FIVE YEARS OF AGE

Caloric requirements decline progressively after the years of early adulthood, because of a decrease in basal metabolic rate as well as lessened physical activity (1).

The *Recommended Dietary Allowances, Revised, 1958* (1), indicate a reduction in calories of 3 per cent per decade between the ages of thirty and fifty and 7 5 per cent per decade from age fifty to seventy. Thus caloric allowances are 21 per cent less at age sixty-five. Values between 1,800 and 2,250 calories are given in the *Recommended Allowances*, depending upon the individual.

Protein, minerals, and vitamins remain at the levels recommended for the young adult. For this purpose, the four food groups outlined in the "Daily Food Plan of Normal Diet for the Adult" (Table 2) will be appropriate. In this way, approximately 1,550 calories will be provided, and protein, minerals, and vitamins will meet or exceed the allowances. A suitable number of additional calories, to fit individual needs, may be obtained to the greatest nutritional advantage by appropriate increases in these four food groups. However, added fats and oils or sugar and sweets may be used if desired. Caloric values may be noted from Tables 2 and 2A and from 35 and 36.

A description of the food groups and the amounts to be used appear in Table 2A. A sample menu pattern and sample meals for the day appear in Table 8. Nutrient evaluation may be made by reference to Table 2.

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REFERENCES

1. FOOD AND NUTRITION BOARD, NATIONAL RESEARCH COUNCIL. Recommended dietary allowances, revised, 1958 ("NAS-NRC Publications," No. 589)
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SECTION II | MODIFICATIONS OF THE NORMAL DIET

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The next step will be to develop a flexible plan of eating which will approximate this level of nutrient content To achieve this goal as concisely as possible, a basic daily pattern of diet has been outlined simply, in terms of commonly used and available food groups For

this purpose, foods have been divided into the four food group which supply the major portion of the day's needs for protein minerals, and vitamins. These four groups include the milk group the meat group, the bread-cereal-potato-legume group, and the vegetable and fruit group. A fifth group—fats and sweets—has been noted separately because this group contributes a major source of calories but comparatively small amounts of protein, mineral, and vitamins. In this manner it will be possible to think in terms of a small number of food groups with approximately similar nutrient characteristics rather than many individual food items. This plan has the advantage of requiring a minimum of effort on the part of the dietitian, nurse, or physician in suggesting appropriate variety on a modified diet or in re-totaling the nutrient content of a diet if certain omissions or additions are made to the basic plan for therapeutic purposes.

The selection and definition of the therapeutic diets which follow have been made in terms of dietetic principles rather than in terms of diseases or names of physicians. These definitions are taken from the *Revised Glossary of Dietetic Terms*, prepared by the Committee on Revision of Glossary of Dietetic Terms, Diet Therapy Section, The American Dietetic Association (1950) (see p. 197). In bringing this material up to date, some recent changes in definitions of diets have been incorporated in line with the recommendations of the Committee on Revisions of the Handbook (1957), Lorraine Weng, chairman.

In each therapeutic diet which follows, a definition has been stated; a basic plan of daily food intake has been evaluated for nutrient content; deviations from the Recommended Dietary Allowances for normal diet have been noted; a description of the Daily Food Plan has been presented in terms of food groups; a menu pattern and sample meals have been derived from this, and, where appropriate, foods to restrict have been noted.

It is not intended, however, that these patterns should be used without appropriate adaptations for individual needs. It is hoped only that the description of each diet has been made sufficiently concise and flexible that it will be possible easily to formulate diets suitable for individual needs and with full awareness of the nutritive content.

Chapter 4 | Modifications in Consistency

LIQUID DIETS

Liquid diets are of two kinds—the full liquid and the clear liquid diet The *full liquid diet* consists of a variety of foods that are liquid or that liquefy at body temperature. Milk, plain frozen desserts, raw eggs, fruit juice, vegetable juice, cereal gruels, and broth may be used Finely homogenized meat or liver may be added to the broth or tomato juice to advantage If this is not done, dried brewer's yeast will serve to improve the iron, protein, and B complex of this diet Such a diet becomes a modification of a normal diet as far as physical consistency is concerned The criterion is that it pour

The foods enumerated in Table 9 will supply 125 gm protein, 2,150 calories, and minerals and vitamins which approximate or exceed the Recommended Allowances for normal diet If more or less of any nutrient is desired for a particular purpose, changes may easily be made by reference to the values given in Tables 9 and 9A for each of the food groups A reassessment may then be made of the total nutrient content

Description of the daily plan of food intake has been made in Table 9A, followed by a sample menu pattern and sample meals in Table 9B Innumerable combinations may be made of these foods. The outlines should be considered examples only

The *clear liquid diet* has been defined in the *Glossary of Dietetic Terms* as one which supplies clear fluids but is of little nutritional benefit Only fat-free broth, tea, and coffee with sugar but without

TABLE 9

NUTRITIVE CONTENT OF FULL LIQUID DIET*

(125 Gm. Protein, 2,150 Calories†)

Daily Food Intake*	Quantity		Calories†	Foodstuffs			Minerals		Vitamins				
	Weight (Gm.)	Approximate Measure		Protein (Gm.)	Fat (Gm.)	Carbohydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Equivalent (Mg.)
Milk, whole...	1,464	1½ qt.	990	51	57	72	1.74	1.2	2,340	15	0.54	2.49	13.8
Milk, non-fat solids...	100	1–1⅓ cups	330	34		48	1.16	0.8	30	10	0.36	1.68	9.2
Eggs	216	4 medium	300	24	24	...	0.12	5.2	2,200		0.20	0.52	7.2
Cereal, enriched ..	20	(dry weight) 2 level tablespoons	80	3	1	15	0.03	0.6	...	...	0.08	0.04	0.8
Fruit juice, citrus ...	246	1 cup	100	2	.	25	0.04	0.4	270	112	0.12	0.04	0.5
Tomato juice.... .	121	½ cup	25	1	.	6	0.01	0.5	1,270	19	0.06	0.04	0.5
Cocoa, dry ..	10	4 level teaspoons	30	1	2	5	0.01	1.2	Trace	...	0.01	0.04	0.3
Sugar	15	1 level tablespoon	60	.	.	15	...	...	...	...	...	...	...
Plain dry gelatin.. .	3	1 level teaspoon	10	3	.	...	...	...	...	...	...	...	...
Bouillon, cube . .	4	1⅝-in. cube		. .		...	...	...	...	...	...	0.07	1.0
Fats or oils..	20	4 level teaspoons	180		20	...	...	...	220	...	...	...	...
Subtotal‡ . . .		. .	2,105	119	104	186	3.11	9.9	6,330	156	1.37	4.92	33.3
Dietary supplement, as finely homogenized liver*.	30	1 oz.	45	7	......	1	......	3.2	6,750	11	0.06	0.93	6.2
Total... . .	.	. ...	2,150†	126	104	187	3.11	13.1	13,080	167	1.43	5.85	39.5

* With the finely homogenized liver, the mineral, vitamin, and protein levels meet or exceed the Recommended Dietary Allowances (Table 3)

† Calories have been rounded off to nearest 5.

‡ To meet additional caloric needs, further amounts of above foods may be included.

TABLE 9A

Description of the Daily Food Plan for the Full Liquid Diet*

(125 Gm Protein; 2,150 Calories, Derived from Table 9)

Daily Food Plan	Description
Milk Group	
1½ qt. fluid whole milk	One and ½ qt. fluid whole milk contain approximately *50 gm. protein and 1,000 calories*. Three-fourths quart of evaporated milk or 1½ cups whole milk solids may be used as a substitute.
1–1½ cups (depending on brand) non-fat milk solids	If 1–1½ cups (depending on the brand) non-fat milk solids are added to the 1½ quarts fluid milk, approximately *34 gm. protein and 330 calories* will be added to the value of this group. This fluid whole milk containing non-fat milk solids may be used in beverages, strained cereal gruels, strained soups, eggnogs, ice cream, and desserts such as soft custard and rennet desserts.
Meat and Egg Group	
1 oz. finely homogenized meat and 3 eggs or variations	Three eggs contain *21 gm. protein and 225 calories*. One ounce finely homogenized meat will contain approximately *7 gm. protein and 75 calories*. Liver is of exceptional value, in iron, vitamin A, and the B complex. However, other finely homogenized meat may be combined with bouillon or broth and served in soup. Meat and eggs may be interchanged.
Vegetable and Fruit Group	
	The purée or juice from spinach, asparagus, carrots, tomato, string beans, or celery may be used. Mild-flavored vegetables are commonly served in soups. However, other vegetable purées or juices may be used if tolerated by the patient. Calories from this source are negligible.
	Citrus or tomato juice daily provides an important source of vitamin C. One cup citrus juice provides approximately *80 calories*, 1 cup tomato juice less than *40 calories*.
Cereal-Potato Group	
1 or more servings	One-half cup strained cooked cereal or ½ cup strained potato contains approximately *70 calories* as well as a source of iron and the B complex. Combinations may be made with milk in gruels or soups.
Fats and Sweets	
	Three teaspoons sugar contribute approximately *60 calories* and serve as flavoring for cocoa, eggnog, or gruel.
	Four teaspoons fat or oil provide approximately *180 calories* and serve as flavoring for gruels or soup.
Dietary Supplement	
	One ounce finely homogenized calf liver supplies *7 gm. protein, 45 calories*, and an important source of iron and the B complex. It may be added to bouillon or tomato juice. If this is not used, additional meat and eggs will supply iron, protein, and the B complex.

* If any omissions or changes are made in the food plan, it should be reassessed for nutrient content.

TABLE 9

NUTRITIVE CONTENT OF FULL LIQUID DIET*

(125 Gm. Protein; 2,150 Calories†)

	Quantity			Foodstuffs			Minerals		Vitamins				
Daily Food Intake*	Weight (Gm.)	Approximate Measure	Calories†	Protein (Gm.)	Fat (Gm.)	Carbohydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Equivalent (Mg.)
Milk, whole	1,464	1½ qt	990	51	57	72	1.74	1.2	2,340	15	0.54	2.49	13.8
Milk, non-fat solids	100	1–1⅓ cups	330	34	...	48	1.16	0.8	30	10	0.36	1.68	9.2
Eggs	216	4 medium	300	24	24	...	0.12	5.2	2,200	...	0.20	0.52	7.2
Cereal, enriched	20	(dry weight) 2 level tablespoons	80	3	1	15	0.03	0.6	...	...	0.08	0.04	0.8
Fruit juice, citrus	246	1 cup	100	2	.	25	0.04	0.4	270	112	0.12	0.04	0.5
Tomato juice	121	½ cup	25	1	...	6	0.01	0.5	1,270	19	0.06	0.04	0.5
Cocoa, dry	10	4 level teaspoons	30	1	2	5	0.01	1.2	Trace	...	0.01	0.04	0.3
Sugar	15	1 level tablespoon	60			15	...	...	...	...	...	...	...
Plain dry gelatin	3	1 level teaspoon	10	3	...	...	...	...	...	...	...	...	...
Bouillon, cube	4	1⅝-in. cube	...	...	...	...	...	...	...	...	...	0.07	1.0
Fats or oils	20	4 level teaspoons	180	...	20	...	...	...	220	...	...	...	...
Subtotal‡	...	...	2,105	119	104	186	3.11	9.9	6,330	156	1.37	4.92	33.3
Dietary supplement, as finely homogenized liver*	30	1 oz.	45	7	...	1	...	3.2	6,750	11	0.06	0.93	6.2
Total	...	...	2,150†	126	104	187	3.11	13.1	13,080	167	1.43	5.85	39.5

* With the finely homogenized liver, the mineral, vitamin, and protein levels meet or exceed the Recommended Dietary Allowances (Table 3).

† Calories have been rounded off to nearest 5

‡ To meet additional caloric needs, further amounts of above foods may be included.

TABLE 9A

DESCRIPTION OF THE DAILY FOOD PLAN FOR THE FULL LIQUID DIET*
(125 Gm. Protein; 2,150 Calories, Derived from Table 9)

Daily Food Plan	Description
Milk Group	
1½ qt. fluid whole milk	One and ½ qt. fluid whole milk contain approximately *50 gm. protein and 1,000 calories.* Three-fourths quart of evaporated milk or 1½ cups whole milk solids may be used as a substitute.
1–1½ cups (depending on brand) non-fat milk solids	If 1–1½ cups (depending on the brand) non-fat milk solids are added to the 1½ quarts fluid milk, approximately *34 gm. protein and 330 calories* will be added to the value of this group. This fluid whole milk containing non-fat milk solids may be used in beverages, strained cereal gruels, strained soups, eggnogs, ice cream, and desserts such as soft custard and rennet desserts.
Meat and Egg Group	
1 oz. finely homogenized meat and 3 eggs or variations	Three eggs contain *21 gm protein and 225 calories.* One ounce finely homogenized meat will contain approximately *7 gm protein and 75 calories.* Liver is of exceptional value, in iron, vitamin A, and the B complex. However, other finely homogenized meat may be combined with bouillon or broth and served in soup Meat and eggs may be interchanged.
Vegetable and Fruit Group	The purée or juice from spinach, asparagus, carrots, tomato, string beans, or celery may be used. Mild-flavored vegetables are commonly served in soups. However, other vegetable purées or juices may be used if tolerated by the patient. Calories from this source are negligible. Citrus or tomato juice daily provides an important source of vitamin C One cup citrus juice provides approximately *80 calories;* 1 cup tomato juice less than *40 calories*
Cereal-Potato Group	
1 or more servings	One-half cup strained cooked cereal or ½ cup strained potato contains approximately *70 calories* as well as a source of iron and the B complex. Combinations may be made with milk in gruels or soups.
Fats and Sweets	Three teaspoons sugar contribute approximately *60 calories* and serve as flavoring for cocoa, eggnog, or gruel. Four teaspoons fat or oil provide approximately *180 calories* and serve as flavoring for gruels or soup.
Dietary Supplement	One ounce finely homogenized calf liver supplies *7 gm. protein, 45 calories,* and an important source of iron and the B complex. It may be added to bouillon or tomato juice. If this is not used, additional meat and eggs will supply iron, protein, and the B complex.

* If any omissions or changes are made in this food plan, it should be reassessed for nutrient content.

milk or cream are allowed. Occasionally small amounts of ginger ale, clear fruit, or vegetable juice and gelatin may be added. This diet would be used for very brief periods of time when it is necessary to minimize the amount of fecal material in the colon.

Tube feedings may be prepared from a mixture of foods modified in consistency to the point at which the mixture may be passed through a tube. Such feedings may vary from a finely homogenized mixture of the foods served on the "regular or house diet" to food combinations designed to serve particular therapeutic purposes (15, 16). An example of a highly nutritious, high-caloric combination of foods which may be used in a tube feeding is outlined in Table 10.

TABLE 9B

MENU PATTERN AND SAMPLE MEALS FOR A FULL LIQUID DIET*
(125 Gm Protein;‡ 2,150 Calories;‡ Derived from Tables 9 and 9A)

SAMPLE MENU PATTERN†	SAMPLE MEALS†
A M	
1 cup citrus juice with 1 egg	Citrus juice with whipped egg
Cereal gruel (made from 2 tablespoons dry cereal) and milk containing non-fat milk solids with sugar, butter, or margarine	Cream of wheat gruel *Sugar and butter or margarine*
Coffee or tea if desired	Coffee with milk and sugar
Noon	
Broth with finely homogenized liver or other meat‡	Broth with finely homogenized liver‡
Eggnog, ice cream, rennet dessert, gelatin dessert, or soft custard	Eggnog Rennet dessert
Milk containing non-fat milk solids	
P M.	
Strained milk soup or cereal gruel‡	*Strained potato soup‡*
Eggnog, ice cream, or dessert as at noon	Ice cream Cocoa

Between

Mid-morning, mid-afternoon, and bedtime: tomato juice with 3 tablespoons dried brewer's yeast or soup with finely homogenized liver or additional eggs in eggnog and desserts. Milk beverage, ice cream, and soft desserts serve as between-meal nourishments.

* If any omissions or changes are made in this food plan, it should be reassessed for nutrient content,

[illegible] not pour has been [illegible] amount, it would [illegible] *extent of pouring*

[illegible] to include 125 gm

TABLE 10

FORMULA OF HIGH NUTRITIVE CONTENT FOR USE IN TUBE FEEDING*

(115 Gm Protein, 3,000 Calories)

Daily Food Intake	Quantity		Calories†	Foodstuffs			Minerals		Vitamins				
	Weight (Gm)	Approximate Measure		Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Ca (Gm)	Fe (Mg)	A (I U)	Ascorbic Acid (Mg)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Equivalent (Mg)
Milk, whole	488	1 pt	330	17	19	24	0.58	0.4	780	5	0.18	0.84	4.6
Cream, 20 per cent	480	1 pt	1,000	14	96	19	0.47	0.2	3,960	6	0.14	0.68	4.4
Calf liver, raw, ground	120	4 oz E P	170	23	6	5	0.01	12.7	27,000	43	0.25	3.74	25.0
Eggs	216	4 medium	300	24	24	Trace	0.12	5.2	2,200		0.20	0.56	7.0
Brewer's yeast, dried	13	5 level teaspoons	35	5		5	0.01	2.4	.	.	1.27	0.72	6.2
Sucrose, glucose, lactose	100	½ cup	385			100		.		.	......	......	......
Milk powder, whole	128	1 cup	630	33	34	49	1.22	0.7	1,790	8	0.39	1.87	8.8
Applesauce‡	60	4 level tablespoons	45			12			20	1	0.01	0.01	0.2
Orange juice	123	½ cup	55	1		14	0.02		230	61	0.10	0.03	0.2
Total§			2,950	117	179	228	2.43	21.6	35,980	124	2.54	8.45	56.4

* From F J Stare and G W Thorn, Protein nutrition in problems of medical interest, J A M A, 127:1120-27, 1945

† Calories have been rounded off to nearest 5

‡ Apple powder or pectin may be added to prevent diarrhea

§ The mineral, vitamin, and protein content of this diet will exceed the Recommended Dietary Allowances (1958) (Table 3) for the normal adult To meet additional caloric needs, further amounts of the above foods may be used and/or other sugars, starches, and fats (see Tables 35 and 36).

SOFT AND LOW-FIBER DIETS

The soft and low-fiber diets follow the normal diet pattern, with modifications in consistency, i.e., including liquid foods and those solid foods which contain a restricted amount of indigestible carbohydrate and no tough connective tissue.

If the only modification required is that a diet be made mechanically soft, this may be accomplished by cooking, mashing, puréeing, or homogenizing the foods used in a normal diet. If consideration must also be given to the indigestible carbohydrate, connective tissue, or flavor, the following modifications may be made.

Indigestible carbohydrates.—These carbohydrates are substances which make up the cell-wall structure of plants, consisting of varying amounts of cellulose, hemicellulose, lignin, pectic substances, gums, and mucin. A number of foods have been analyzed for their cellulose, hemicellulose, and lignin content by Williams and Olmsted (1), by Olmsted and Williams (2), and by Hummel, Shepherd, and Macy (3). Figures for total fiber determined chemically as crude fiber have been included in the compilation by Chatfield and Adams (4) and in *Composition of Foods—Raw, Processed, Prepared* ("Agriculture Handbooks," No. 8 [U.S. Department of Agriculture, 1950]).

A reduction of the indigestible carbohydrate content of the diet may be effected by the use of refined breads and cereals, immature vegetables, and fruits from which the skins and seeds have been eliminated. During cooking, both the pectic substances and the cellulose are disintegrated (5). For this reason, cooked vegetables and fruits are sometimes used instead of the raw. In extreme instances, still greater reduction in indigestible carbohydrates may be effected by the use of puréed vegetables and fruits or the juice only of the vegetable or fruit.

The trend in recent years, however, has been a more liberal one, due in large part to the observation (6) that vegetable purées are notoriously unpopular and that many patients refuse to eat them. The use of immature vegetables such as frozen or canned young vegetables resulted in a more palatable diet and happier patients, who benefited from eating vegetables which were refused if puréed.

There has also been a trend to the use of a wider variety of fruits

and vegetables, including some raw fruits Removal of skins and seeds is usually specified, however. Peeled apples, pears, peaches, apricots, and bananas are frequently recommended.

Connective tissue.—Whether meat is tender or less tender is due chiefly to the relative quantity of connective tissue present. Connective tissue in meat consists of white or collagenous fibers and yellow elastic fibers called "elastin." The total amount of connective tissue depends not only on the extent to which the muscle has been exercised but somewhat on the age. In general, older animals have denser, tougher connective tissue than do younger ones, although the toughness may be lessened in an older animal which has been confined and fattened.

This quantitative difference in the amount of connective tissue present forms the basis for an appropriate cookery process. Tenderness of meat may be increased in cooking with moist heat by the conversion of the collagen in the connective tissue to gelatin and also by the use of low-temperature cookery, in order to reduce or lessen the toughening or hardening of soluble proteins. The total effect of these two reactions depends on the composition of the meat, its acidity, the temperature, and the rate at which it is cooked (7).

Flavor.—Muscle tissue contains such non-protein nitrogenous products as creatine, creatinine, purines, and other products which are thought to stimulate the flow of gastric juices The most important non-nitrogenous extractive from a quantitative viewpoint is lactic acid (8). In the usual mixed diet, the effect of this factor is minimized, and this consideration becomes of less importance; however, if it is desirable to limit the extractives, poultry as well as meat, meat broths, consommé, and gravy will have to be restricted. In this case adequate compensation for protein and other nutrients provided by meat may be made by the proportional increase in other protein-containing foods.

In recent years the trend in the use of a wide variety of meats has been a liberal one. Beef, veal, pork, lamb, liver, poultry, and fish are all commonly used Exceptions are generally in terms of the special needs of an individual patient.

Strongly flavored vegetables, such as onions, leeks, radishes, dried beans, and vegetables of the cabbage family—Brussels sprouts,

cauliflower, broccoli, and turnips—have comm
Here again it has been found (6) that many pat
some of the strongly flavored or "gas-forming v
particular discomfort, if the vegetables are prop
prevent the decomposition of sinigrin and any
yielding disagreeable products that may be presen
should be heated quickly, to destroy enzymes that
position; the kettle kept uncovered, to prevent the
coming acid; the cooking period made as short as p
vegetable drained and served immediately when it
tables contain both volatile and non-volatile acids, a
are released largely in the first few minutes of cook
kettle retains not only the volatile sulfur compound
odor and flavor but also volatile vegetable acids, which f
position of the sulfur compounds present (9). *With pro
it may be desirable, therefore, to eliminate only those vege
the individual patient cannot tolerate rather than to eliminate
flavored vegetables.*

It is now less common to restrict all spices. Schneider,
and Gray (10) have studied the effect of spice ingestion u
mucosa of fifty patients with active duodenal or gastr
craters. In periods of up to 180 days, it was found that cin
allspice, mace, thyme, sage, paprika, and caraway seed admin
with food did not exert a harmful effect upon the stomach as j
by the rate of ulcer healing and clinical symptomatology, the g
scopic appearance of the stomach before and after the ingesti
spices, and the effect on gastric secretion of pepsin. Black pep
chili pepper, cloves, mustard seed, and possibly nutmeg were c
sidered gastric irritants.

Beverages.—Coffee contains caffeine, fat, coffalic acid, and chlor
genic acid, which, on oxidation, yields caffeic acid. The chlorogen
acid differs from tannins in that it does not precipitate proteins an
is therefore not astringent. The percentage of caffeine varies from
$\frac{2}{3}$ to $2\frac{1}{2}$ per cent, with an average of $1\frac{1}{4}$ per cent (11). The main
change in roasting consists in the production of aromatic, brown,
and oily substances. This oil consists of 50 per cent furfurol alcohol,
small quantities of valerianic acid, phenol, pyridine, and a nitrog-

enous aromatic substance. A cup of strong coffee contains about 0.1–0.15 gm. of caffeine. A cup of coffee has also been found to contain about 1 mg. of niacin, as well as small amounts of thiamine and riboflavin.

Tea contains caffeine (1.4–3.5 per cent), tannins (1–30 per cent), and traces of theobromine, theophylline, xanthine, and volatile oils. A cup of strong tea prepared from 1 teaspoon of dried leaves contains about 0.1 gm. of caffeine. A quick infusion extracts practically all the caffeine but only part of the tannins. The customary brief infusion is therefore recommended. Tea also contains traces of riboflavin and niacin.

Cocoa contains $1\frac{1}{2}$–$4\frac{1}{2}$ per cent theobromine, a trace of caffeine, 31 per cent carbohydrate, 9 per cent protein, and approximately 10 per cent fat.

Nutrient content.—In the past it was common practice to put more emphasis on "foods to avoid" and less on "foods to eat," with the result that this group of diets has been singled out by Duncan (12) and Pollack *et al.* (13) as one of the hazards of hospitalization, resulting in nutritional deficiency and delayed convalescence. Any such deficiency is unnecessary and can be avoided if care is given to the proper selection and amount of food used.

Milk, eggs, meat, poultry or fish, vegetables, and fruit may be used in amounts sufficient to meet or exceed the Recommended Dietary Allowances. This is particularly important for those individuals who have been ill for some time and who may have made undue dietary restrictions, resulting in an inadequate intake of nutrients. In addition, changes due to the disease itself may impose further nutritional demands, in order to hasten healing of tissue or to compensate for poor absorption. Such extra requirements would justify an increase in all the food groups, above the level recommended for the normal diet. For example, when this diet is used for reduction of gastric acidity, the number of meals and distribution may be given in 6 or more small feedings per day. Since protein-containing foods are effective in buffering the acidity of the stomach, it will be advantageous to fortify fluid milk with sufficient non-fat milk solids at least to double the natural protein content of milk, thus totaling approximately 70 gm. protein per quart. In this case,

TABLE 11—NUTRITIVE CONTENT OF SOFT AND LOW-FIBER DIET* (135 Gm. Protein; 2,575 Calories)

Daily Food Intake	Quantity		Calories†	Foodstuffs			Minerals		Vitamins				
	Weight (Gm.)	Approximate Measure		Protein (Gm.)	Fat (Gm.)	Carbohydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Equivalent (Mg.)
Milk, whole	976	1 qt.	660	34	38	48	1.16	0.8	1,560	10	0.36	1.68	9.2
Milk, non-fat solids	100	1–1⅓ cups	330	34	.	48	1.16	0.8	30	10	0.36	1.68	8.8
Eggs	108	2 medium	150	12	12	Trace	0.06	2.6	1,100	...	0.10	0.28	3.6
Meat, poultry, fish, cooked, or cheese‡	120	4 oz. E.P.	300	28	20	...	0.10§	3.8	6,610	4	0.27	0.74	10.8
Bread, white, enriched	180	6 slices	480	16	6	90	0.16	3.6	....	...	0.48	0.26	6.6
Cereal, refined, enriched	20	⅔ cup	80	3	1	15	0.03	0.6	......	...	0.08	0.04	0.8
Potato, cooked	100	1 medium	85	2		19	0.01	0.7	20	14	0.09	0.03	1.3
Vegetable, green or yellow, cooked‖	100	½ cup	30	2	...	6	0.06	1.1	5,325	13#	0.06	0.11	1.3
Vegetable, other, cooked**	100	½ cup	35	2	..	8	0.02	0.8	470	11#	0.06	0.05	0.5
Fruit juice, citrus	123	½ cup	50	1	..	13	0.02	0.2	135	56	0.06	0.02	0.2
Fruit, other, cooked, sweetened††	100	1 serving	75	.	..	19	0.01	0.3	410	2	0.02	0.02	0.4
Subtotal			2,275	134	77	266	2.79	15.3	15,660	120	1.94	4.91	43.5
Separated fats or oil, and	20	4 level teaspoons	180		...	...	......	......	220	......	......	......	......
Sugar	30	6 level teaspoons	120	.	.	......	......	......	......	......	......	......	......
Total*	......	......	2,575	134	...	......	2.79	15.3	15,880	120	1.94	4.91	43.5

* The mineral, vitamin, and protein content of this diet will meet or exceed the Recommended Dietary Allowances (Table 3) for a normal sedentary man (70 kg.) or a physically active woman (58 kg.). To meet additional caloric needs, further amounts of the above foods may be used, plus other sugars, starches, and fats (see Tables 35 and 36)

† Calories have been rounded off to nearest 5

‡ Weighted on average food consumption data (except liver). If 3½-oz. liver are not used weekly, the vitamin A value and ascorbic acid must be discounted completely.

§ If 4 oz. Cheddar-type cheese are not used during a 10-day period, an additional 100 gm. milk daily will supply equivalent calcium

‖ Asparagus, carrots, green beans, yellow squash, pumpkin, spinach, and other greens

For canned vegetables, reduce by one half

** Beets, peas, summer squash, and tomato juice or tomato purée

†† Applesauce, pear, peach, apricot, plum, and sweet cherries. Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values as in Table 34

TABLE 11A

Description of the Daily Food Plan for the Soft and Low-Fiber Diet*

(135 Gm. Protein; 2,575 Calories; Derived from Table 11)

Daily Food Plan†	Description
Milk Group	
1 qt. fluid, whole milk	One quart of fluid whole milk contains *660 calories and 34 gm. protein.* One pint evaporated milk or 1 cup whole milk solids may be substituted for 1 qt. fluid whole milk.
1–1⅓ cup (depending on the brand) non-fat milk solids	One–1⅓ cups non-fat milk solids contains approximately *330 calories and 34 gm. protein.* This may be added to the 1 qt. of fluid whole milk *or* incorporated into cereal, desserts, mashed potatoes, or cottage cheese.
	The amounts of fluid whole milk and non-fat milk solids indicated above contain important amounts of protein, calcium, phosphorus, and the B complex.
Meat and Egg Group	
6 meat equivalents	*One meat equivalent* is approximately equal to 1 oz. cooked (edible portion) beef, veal, pork, lamb, poultry, fish, cheese or 1 egg. Each equivalent contributes approximately *7 gm. protein and 75 calories* Liver and other glandular meats are exceptional sources of iron, vitamin A, and the B complex.
Vegetable and Fruit Group	
4 servings	*A dark-green or yellow vegetable is important daily for vitamin A value.* Asparagus, carrots, green beans, yellow squash, pumpkin, spinach, and other greens are in this group Additional vegetables commonly used include beets, peas, summer squash, and tomato juice or tomato purée. Other vegetables may be used as tolerated by the patient. Yellow squash, pumpkin, carrots, beets, and peas contain approximately *35 calories* per serving The others are negligible in calories.
	One-half cup citrus juice or 1 cup tomato juice daily will contribute an important part of the vitamin C needed daily Approximately *40 calories* per serving come from this source. Other fruits without skins or small seeds may be used. One serving of sweetened fruit may contain between *75 and 100 calories.*

* If any omissions or changes are made in this food plan, it should be reassessed for nutrient content [illegible]

TABLE 11A—*Continued*

Daily Food Plan†	Description
CEREAL-BREAD-POTATO GROUP	
8 servings	*One serving provides approximately 70 calories* and is equal to 1 slice enriched bread, ½ cup potato, ½ cup cooked macaroni, noodles, spaghetti, rice, cornmeal or ½ cup cooked cereal or ¾ cup refined flake-type cereal. For other equivalents in calories see Table 25. Other substitutes may be added as tolerated by the individual.
FATS AND SWEETS	*Without this group* the diet contains approximately *2,000–2,300 calories* (depending on the use of skim rather than whole milk indicated above). Six teaspoons sugar, jelly, or honey add about *120 calories.* Four teaspoons fat or oil add about *225 calories.* For additional calories in desserts see Tables 35 and 36.

it is well to add sufficient eggs, citrus juice, and other foods to exceed the Recommended Dietary Allowances (Table 3, p. 13) for the normal individual. Special adaptations may be made to suit the needs of any one individual and with a full awareness of the nutritive content by reference to Table 11.

The nutritive content of the soft and low-fiber diet is indicated in Table 11, showing approximately 135 gm. protein and 2,500 calories. Minerals and vitamins exceed the levels indicated in the Recommended Dietary Allowances (Table 3) for the normal individual. A description of the daily food plan and a sample menu pattern and sample meals appear in Tables 11A and 11B. It is intended that appropriate adaptations of this plan be made in food selection or in calories and other nutrients to suit individual needs. However, if changes or omissions are made in any of the food groups, a reassessment of the nutrient content should be made by reference to Table 11.

TABLE 11B

Menu Pattern and Sample Meals for Soft and Low-Fiber Diet

(135 Gm. Protein, 2,575 Calories; Derived from Table 11)

Sample Menu Pattern*	Sample Meals*
A M	
½ cup citrus juice or 1 cup tomato juice	Tomato juice
1 egg	1 egg
½ cup cooked refined cereal or ¾ cup flake-type with milk (containing milk solids) and sugar‡	Cream of wheat (with milk and non-fat milk solids) with sugar†
1 slice enriched toast with spread†	Toast with spread†
Coffee or tea if desired	Coffee
Noon	
2 oz. tender meat, poultry, fish, or cheese	Roast beef
½ cup potato or alternate	Mashed potato
Cooked vegetables as asparagus, carrots, spinach, yellow squash, pumpkin, or other greens; other vegetables may be used as tolerated	Asparagus tips
Fruit (no skin or seeds)	Sliced peaches
1 slice enriched bread with spread†	Enriched bread with spread†
1 glass milk (containing non-fat milk solids)	1 glass milk (containing non-fat milk solids)
Dessert†	Plain cake†
P M	
Soup (made from milk containing non-fat milk solids)	Cream of tomato soup
2 oz. (edible portion) cooked meat, poultry, fish, cheese or 2 eggs	Tuna with rice casserole
1 cup rice, spaghetti, noodles, potato, or alternate*	Peas
Cooked vegetables (as at noon)	1 glass milk (containing non-fat milk solids)
1 glass milk (containing non-fat milk solids)	2 slices enriched bread or alternate*
2 slices enriched bread with spread† or alternate*	Ice cream†
Dessert†	
Between	
Eggnog or milk beverage	Eggnog

* See Table 11A for alternates and total amounts to use daily

† Six teaspoons sugar (120 calories) and 4 teaspoons fat (180 calories) may be used during day, or, if a substitution is desired for the 300 calories calculated in sugar and fat, ½ cup ice cream, plain pudding, custard, or gelatin dessert may add 150–300 calories. One serving plain cake may add 200–300 calories (see Tables 35 and 30 for additional caloric values)

as a gross guide. Such a deficit may be expected to bring about a loss in body weight in the range of 1 pound per week. The exact loss on the scale, however, will be influenced by factors affecting water balance, heat loss, metabolism, activity, and the presence of disease. Most women lose weight satisfactorily on diets between 1,000 and 1,500 calories and most men on diets between 1,500 and 2,000.

Nutrient content.—The patterns of diet and modifications which have been outlined in Tables 12, 12A, and 12B for a calorie-restricted diet for adult, for adolescent, or for use during pregnancy are all based upon amounts of the essential food groups which provide levels of protein, minerals, and vitamins indicated in the *Recommended Dietary Allowances, Revised, 1958* (Table 3). These plans have the advantage of being the most likely to provide for the maintenance of good nutritional health, and, as such, they provide the basis for a long-term dietary program of weight control.

If, in each case, foods for the dietary program are derived from well-liked, familiar foods which suit various ethnic and cultural habits, the likelihood of the patient's maintaining a permanent program of weight control is greatly increased. This individualization should be possible in large degree with the wide variety of alternates suggested within each essential food group; however, if any changes are made in the amounts of the essential food groups, the nutrient content should be reassessed by reference to Tables 2, 3, and 7.

Preparation.—It will be necessary to take advantage of ways of cooking and flavoring foods that do not depend on the use of fats and sweets, unless these have been planned as part of the regimen. The suggestions below are only a few of many possibilities for obtaining flavorful food.

Aluminum foil serves to protect meat, poultry, or fish from fat and oil while baking or roasting or in frying in the same pan used by the family. Salt, pepper, spices and herbs, onion, garlic, or green pepper may be used as desired.

Meat or fish simmered or baked in a tomato sauce (canned tomatoes, green pepper, mushrooms, onions, garlic, salt, spices, or herbs) also provides a convenient method of cooking without added fat or oil.

Vegetables may be cooked together for flavor or boiled in bouillon.

Mint, spices, or herbs provide variety in flavor; or small amounts of dried cheese, such as Parmesan, Romano, or American, may be added to the vegetable at the table. A hot, French-type dressing may also be used to add interest to cooked vegetables. This may be made from tomato juice or tomato purée flavored with lemon or vinegar, grated onion, celery, garlic, salt, horse-radish, spices, and herbs to suit the taste. Artificial sweetener may be added if desired. This dressing serves as a good French-type dressing on salads also. The calories are negligible. Mineral oil is not a satisfactory product for use in salad dressing. Curtis (1) has calculated that each ounce of mineral oil will dissolve 140,000 I.U. of carotene at body temperature and 120,000 I.U. at room temperature. Since it has been shown also that the ingestion of liquid petrolatum or mineral oil is capable of interfering with absorption of vitamin D, calcium, phosphorus, and vitamin K, it has been concluded by the Council on Foods and Nutrition of the American Medical Association (2) that there can be no justification for the incorporation of mineral oil in foods.

Desserts may be prepared by combining the milk and eggs from the food allowance into eggnog, flavoring with extract, and sweetening with an artificial sweetener. This may be baked as custard or frozen as eggnog ice cream. The addition of the fruit allowance to this dessert will add further variety Rennet tablets added to flavored milk will also provide attractive milk desserts. Fruit whips may be made from the fruit allowance, unsweetened gelatin, or egg white.

If a patient must eat in a restaurant or cafeteria, it is generally more satisfactory to select plain foods such as roasted or broiled meat rather than stews or fricassees, to select salads without dressing and plain fresh fruits rather than other desserts.

Maintenance diet.—After reaching the desirable weight, it will become necessary to establish a level of calories on which weight is maintained. Obviously, it will not be possible to go back to the old habits of eating and inactivity without regaining weight. A gross guide to the level of calories needed may be deduced from the rate of weight loss and the caloric intake during the final period of reducing. For example, if the patient has been losing at the rate of ½ lb. per week in the final weeks of reducing, it is probable that an additional 200–300 calories per day will be sufficient to maintain his weight.

TABLE 12

Description of Food Plan for Calorie-restricted Diets for an Adult

(80 Gm. Protein; 1,385 Calories; Derived from Normal Diet, Table 2)

Daily Food Plan	Description
MILK	
1 pt. skim	One pint skim milk contains *165 calories, 17 gm protein*, and important amounts of calcium, phosphorus, and the B complex. One pint of buttermilk made from skim milk or ½–⅔ cup non-fat dry milk (depending on brand) may be substituted for this.
MEAT GROUP	
6 meat equivalents	*One meat equivalent* is approximately equal to 1 oz. (edible portion, weighed after cooking) beef, veal, lamb, pork, poultry, fish, cheese or 1 egg. The six equivalents may be distributed throughout the day as desired. Liver and other variety meats are exceptional sources of vitamin A, iron, and the B complex. One ounce of cooked meat or 1 egg may contain approximately *7 gm. protein and 75 calories.*
VEGETABLE AND FRUIT GROUP	
6 servings	*A dark-green or deep-yellow vegetable* is important each day for its vitamin A value. Asparagus, green beans, broccoli, carrots, green peppers, winter squash, pumpkin, and other greens make up this group. Carrots, winter squash, and pumpkin contain about *35 calories* per ½-cup serving. The others will be negligible.
	Other vegetables, as beets, cabbage, cauliflower, celery, cucumber, eggplant, lettuce, tomatoes, mushrooms, onions, peas, or turnips, contribute varied amounts of all nutrients. Beets, onions, peas, or turnips may contribute about *35 calories* per ½-cup serving. Others will be negligible.
	Citrus fruit or other fruit rich in vitamin C is important each day. One orange or ½ cup juice or ½ grapefruit or ½ cup juice or 1 cup tomato juice or 1 cup strawberries or 1 cup red raspberries or ¼ cantaloupe or 1 large tangerine contains about *40 calories* per serving and important amounts of vitamin C.
	Other fruits, as 1 apple or 1 peach or 1 pear or 2 prunes or 4 halves apricots or 12 grapes or ½ banana, contribute varied amounts of nutrients and contain about *40 calories* per serving. For equivalent amounts of other fruits see Table 24, p. 79. If sugar or syrup is included, additional calories must be calculated.

Daily Food Plan	Description
BREAD-CEREAL-POTATO-LEGUME GROUP	
7 servings	*One serving provides approximately 70 calories,* important amounts of the B complex, and iron. One serving is equal to 1 slice enriched or whole-grain bread, ½ cup white potato, ¼ cup sweet potato, ⅓ cup corn, ⅓ cup cooked macaroni, noodles, spaghetti, rice, cornmeal, ⅓ cup cooked dried beans or peas, ½ cup cooked cereal, ¾ cup flake-type cereal, 2 Graham crackers, or 5, 2-inch-square soda crackers For other equivalents see Table 25, p 80.
FATS AND SWEETS	
	Without this group the calories for the day approximate 1,385. *If 1 level teaspoon fat or oil* is used on bread, in vegetables, or in cooking, about *45 calories* will be added. One thin slice crisp bacon, 2 tablespoons light cream or 1 tablespoon heavy cream, 1 teaspoon mayonnaise or oil, 1 tablespoon cream cheese or French dressing, 5 small olives, or 6 small nuts contain about *45 calories* each.
	One level teaspoon sugar, jelly, or honey in cooking, on cereal, on fruit, or in coffee adds *20 calories.* One-half cup ice cream, pudding, or gelatin dessert may add between *150 and 300 calories;* and 1 serving cake or pie between *300 and 700 calories* (see Tables 35 and 36 for additional caloric values).

MODIFICATIONS OF THE CALORIE-RESTRICTED DIET

1,385 calories, using additional meat.—If more meat is desired, 1 additional meat equivalent (1 oz.—edible portion—cooked meat) may be substituted for 1 serving of the bread group without a significant change in calories. Other rearrangements or omissions should be assessed by reference to Table 2.

1,600 calories, for use during pregnancy.—Since the normal diet should be supplemented with 1 pt. of skim milk (165 calories) and 1 meat equivalent (75 calories) to meet the Recommended Dietary Allowances (Table 3) for the second half of pregnancy, the diet will become approximately 1,625 calories if no added fats and sweets are used. For other changes in the daily food plan, the diet should be reassessed by reference to Table 2. The use of iodized salt in regions where iodine is lacking may be important during pregnancy.

1,600 calories, for use during adolescence —In view of the increased dietary allowances recommended for growth during adolescence, 1 pt. of milk and 1 meat equivalent have been added (Table 7) If the quart of milk indicated is used as skim milk and 1 meat equivalent is added, the diet becomes approximately 1,600 if no fats or sweets are used Any omissions or rearrangements should be reassessed by reference to Tables 3 and 7 in the text.

1,200-calorie diet for an adult.—If 3 servings of the bread-potato-cereal-legume group are omitted from the Daily Food Plan indicated above, the diet will become approximately 1,200 calories. Iron and the B complex will be correspondingly lowered Reference may be made to Table 3, *Recommended Dietary Allowances, Revised, 1958,* to determine whether this reduction is desirable.

1,800-calorie diet —In this case 350 calories may be *added* from any of the food groups desired by the patient. 350 calories may be added from the use of 4 oz. meat group, *or* from 4 servings of the bread group, *or* from additional fats and sweets. Additional caloric values may be noted from Tables 35 and 36.

TABLE 12A

Menu Pattern and Sample Meals for a Calorie-restricted Diet for an Adult*

(80 Gm Protein; 1,385 Calories; Derived from Tables 2 and 12)

Daily Food Plan†	Sample Menu Pattern	Sample Meals
	A.M.	
Milk Group 1 pt. skim **Meat Group** 6 equivalents‡ *One equivalent equals* 1 oz. edible portion of cooked beef, veal, lamb, pork, poultry, fish, cheese, or 1 egg)	1 citrus fruit or ½ cup juice 1 egg ½ cup enriched or whole-grain cereal (cooked) or ¾ flake-type cereal, or alternate 1 slice toast Coffee or tea if desired	Sliced orange Poached egg on toast Flake-type cereal Milk, skim Coffee or tea if desired
	Noon	
Vegetable and Fruit Group 6 servings *A dark-green or deep-yellow vegetable* daily for vitamin A value *A citrus fruit* or other fruit rich in vitamin C daily **Bread-Cereal-Potato-Legume Group** 7 servings	3 oz. (3 equivalents) lean meat, poultry, or fish ½ cup potato or substitute Dark-green or deep-yellow vegetable Other vegetable 1 fruit 2 slices enriched or whole-grain bread or alternate 1 glass skim milk	Broiled ground lean meat Baked potato Spinach Tomato and lettuce salad with special dressing§ ¼ cantaloupe 1 slice bread 2 Graham crackers 1 glass skim milk
	P.M.	
Fats and Sweets *(Without this group* the diet contains 1,385 calories)‖	2 oz. (2 equivalents) lean meat, poultry, fish, cheese, or 2 eggs Vegetable 1 fruit 1 glass skim milk 2 slices enriched or whole-grain bread or alternate	Sandwich: 1 slice cheese 1 slice meat 2 slices bread Tossed salad with special dressing§ Fresh strawberries Skim milk

* See Table 12B for modifications during pregnancy or adolescence. For other caloric levels, see Table 12.

† See Table 12 for alternates or equivalents within each food group.

‡ If additional meat is desired, 1 meat equivalent (1 oz. lean meat) may be added, and 1 serving from bread group omitted. Other rearrangements or omissions should be reassessed by reference to Tables 2 and 3.

§ See text, p. 46, for discussion of food preparation.

‖ If 1 level teaspoon sugar, jelly, or honey is used, approximately 20 calories will be added. If 1 level teaspoon fat or oil is included, approximately 45 calories will be added. A dessert, such as ice cream, pudding, or gelatin dessert, may add 150–300 calories, pie or cake may add 300–700 calories (see Tables 35 and 36 for additional caloric values).

TABLE 12B

Menu Pattern and Sample Meals for a Calorie-restricted Diet During Pregnancy or Adolescence

(100 Gm Protein; 1,600 Calories; Derived from Tables 2 and 7)

Daily Food Plan*	Sample Menu Pattern	Sample Meals
	A.M.	
Milk Group 1 qt. skim **Meat Group** 6 equivalents† (*One equivalent equals* 1 oz edible portion cooked beef, veal, lamb, pork, poultry, fish, cheese, or 1 egg)	1 citrus fruit or ½ cup juice 1 egg ½ cup cooked, enriched, or whole-grain cereal or ¾ cup flake-type cereal or alternate One slice enriched or whole-grain toast Skim milk Coffee or tea if desired	½ grapefruit Poached egg on toast ¾ cup flake-type cereal Skim milk Coffee or tea if desired
	Noon	
Vegetable and Fruit Group 6 servings *A dark-green or deep-yellow vegetable* daily for vitamin A value *A citrus fruit* or other fruit rich in vitamin C daily	2 oz (2 equivalents) lean meat, poultry, fish, cheese, or 2 eggs Vegetable 1 fruit 2 slices enriched or whole-grain bread or alternate 1 glass skim milk	Sandwich, 2 slices lean meat 2 slices bread Heart of lettuce with special dressing‡ Fresh pear 1 glass skim milk
	P.M.	
Bread-Cereal-Potato-Legume Group 7 servings **Fats and Sweets** (*Without this group* the diet contains approximately 1,600 calories)§	3 oz (3 equivalents) lean meat, poultry, fish, or cheese ½ cup potato or substitute Dark-green or deep-yellow vegetable Other vegetable 1 slice bread or substitute 1 fruit 1 glass skim milk	Lean roast beef Potato Frozen green beans with sweet-sour sauce‡ Raw carrot sticks 1 small hot roll Baked apple 1 glass skim milk
	Between	
	1 glass skim milk with 2 Graham crackers	1 glass skim milk with 2 Graham crackers

* See Table 12 for variety in selection within each food group

† If additional meat is desired, 1 oz lean meat may be added and 1 serving of the bread group omitted without alteration in calories. Other rearrangements or omission should be reassessed by reference to Tables 2, 3, and 7

‡ See text, p. 46, for discussion of food preparation.

§ If 1 level teaspoon sugar, jelly, or honey is used, 20 calories will be added. If 1 level teaspoon fat or oil is used, 45 calories will be added (see Tables 35 and 36 for additional caloric values).

HIGH-CALORIC DIET

The high-caloric diet is a prescribed food allowance which has a caloric value above the total energy requirement per day, thus providing for storage of fat; proteins, minerals, and vitamins are at or above the levels in the normal diet.

Appraisal of the home dietary intake.—A deficit in the caloric content of the patient's customary food intake is frequently accompanied by a deficiency in proteins, minerals, or vitamins. This means that the dietitian is faced with the problem of obtaining reliable information regarding the over-all nutritive content of the usual food intake.

Caloric allowance.—The levels of caloric intake to be recommended may vary, depending upon the individual's energy requirement for maintenance and the rate of weight gain desired.

A guide to caloric allowances for the normal individual at moderate activity has been recommended by the Food and Nutrition Board of the National Research Council (Table 3). More specific estimates under various conditions of work, recreation, and exercise have been compiled by Passmore and Durnin (3) (See Appendix X, p. 194).

A gross guide to the number of calories which must be added above the level of calories required for maintenance of body weight is the allowance of 500 additional calories per day. This increase may permit a gain of approximately 1 pound of body tissue per week. However, the exact gain may vary, depending upon the degree of activity and upon factors affecting heat loss, the water balance, and the presence of disease.

Dietary recommendations.—Since food habits are most easily and permanently changed when consideration is given to the ethnic and cultural pattern of eating, the simplest place to start is with a food diary in which the patient has recorded his self-chosen food intake. The sufficiency of this diet for various nutrients may be assessed by reference to the outlines of normal diet in Tables 2, 6, and 7.

The next step that will be of the greatest nutritional advantage to the patient will involve the addition of any foods from the essential four groups which may be in deficit and which are sufficiently acceptable to the patient to permit the use of additional amounts.

Several practical suggestions for supplementing the diet by 500 calories are listed here.

MILK GROUP 500 calories	A milk beverage containing about 500 calories may be prepared by adding $\frac{1}{2}$–$\frac{2}{3}$ cup (depending on the brand) non-fat dry milk solids (165 calories) to 1 pint of whole milk (330 calories). The addition of flavoring, such as 1 tablespoon sugar (60 calories) and 2 teaspoons cocoa (35 calories), will add another 100 calories. If the milk is preferred plain, the non-fat dry milk solids may be incorporated into such foods as cottage cheese, mashed potato, macaroni, and cereals.
	Or
MEAT-EGG-BREAD GROUP 500 calories	A sandwich containing approximately 500 calories may be prepared by using two slices of meat or cheese (150 calories), 1 tablespoon mayonnaise or fat spread for bread (135 calories); and 2 slices bread (150 calories). One egg in beverage, dessert, or plain will add about 75 calories.
	Or
CEREAL AND MILK GROUP 500 calories	Cereal and milk with a banana or other fruit may provide about 500 calories if used as follows: One cup cooked cereal or $1\frac{1}{3}$ cups flake-type cereal (150 calories) may be served with 1 cup whole milk (165 calories) to which $\frac{1}{4}$–$\frac{1}{3}$ cup (depending on the brand) non-fat dry milk solids (85 calories) has been added. One tablespoon sugar (60 calories) and a sliced banana (80 calories) will bring the total to approximately 500 calories. For some individuals this serves as an enjoyable bedtime snack.
	Or
FATS AND SWEETS	For calories obtained from additional desserts and sweets or from fat and oils see Tables 35 and 36.

Distribution of meals throughout the day.—In some instances, an increase in the number of feedings may be indicated. In others, a decrease in the number of feedings per day will result in a better appetite and an increase in total food consumption. Lundgren and Hammarsten (4) report that the amount of edible tray waste de-

creased significantly when the quantity of between-meal nourishment was reduced. Keeton (5) has also reported highly significant increases in caloric intake when the number of meals was reduced to one or two per day.

Plan of diet.—For a sample menu and plan of meals see the appropriate plan of normal diet. Supplements as suggested above may then be added; or other possibilities may be developed by reference to Tables 35 and 36.

If a high-caloric modification of a therapeutic or a liquid or soft diet is desired, the respective evaluations, menu patterns, and meal plans should be noted, and adaptations made to suit individual needs.

REFERENCES

1. CURTIS, A. C. The mineral oil vitamin A problem, Virginia M. Monthly, 69:235–36, 1942.
2. COUNCIL ON FOODS AND NUTRITION, AMERICAN MEDICAL ASSOCIATION. Mineral oil (liquid petrolatum) in foods, J.A.M.A , 123:967–69, 1943.
3. PASSMORE, R., and DURNIN, J. V. G. A. Human energy expenditure, Physiol. Rev., 35:801–40, 1955.
4. LUNDGREN, E. M., and HAMMARSTEN, J. F. Effect of between-meal nourishments on tray food waste, J. Am. Dietet. A., 25:873–74, 1949.
5. KEETON, R. W. Influence of distribution of meals on appetite in the sick, J. Am. Dietet. A., 26:336–44, 1950.

Chapter 6 | *Modifications in Fat Intake*

A food allowance may be modified in terms of a prescribed level of fat, in terms of the percentage of fat calories, or in terms of the amount of, or ratio between, fatty acids Other nutrients should remain at a level suitable for nutritive efficiency.

"AVERAGE" FAT CONSUMPTION IN THE UNITED STATES

The kind and extent of the changes which would be necessary in making modifications in the level of fat, the proportion of calories from fat, or the amounts of and ratio between fatty acids may be judged in some degree from the contribution of various food groups in the average diet in the United States (Table 13).

An average of 155 gm. fat per person per day was available for consumption in the United States, according to data collected in the 1955 food consumption survey (1), thus accounting for approximately 44 per cent of the total calories It should be noted, however, that no deductions were made in the survey for food discarded.

Stiebeling (2) has estimated the nutritive content of the average diet to be as follows. calories, 3,200; fat, 155 gm.; protein, 103 gm.; calcium, 1 2 gm.; iron, 18 mg , vitamin A value, 8,540 I.U.: thiamine, 1 6 mg., riboflavin, 2 3 mg., niacin, 10 mg ; ascorbic acid, 106 mg. This "average," however, should be regarded only as a statistical average. Obviously, wide differences will occur in individual food habits

TABLE 13*

Total Fat and Selected Fatty Acids in Diets, by Food Group, Households in the United States
(Average per Person per Day from Food Used at Home in Week, April–June, 1955)

Food Group†	Total Fat (Gm)	Saturated Fatty Acids (Gm)	Oleic Acid (Gm)	Linoleic Acid (Gm)
Beef, veal, lamb	22 1	11 0	8 8	0.4
Pork (excl bacon, salt pork)	15.1	6 0	7 6	1.5
Poultry, fish	4 4	1 2	1.6	0.8
Bacon, salt pork	13 4	5 4	6 7	1.3
Lard	9 2	3.7	4 6	0 9
Other shortening	9.0	2 2	5 8	0 7
Oils, salad dressing	9 3	1 9	2 8	4 6
Margarine	10 4	2 6	6 4	0 8
Butter	10 6	7 0	2 9	0 4
Milk, cream, ice cream, cheese	28 0	18 5	7 6	1.0
Eggs	5 6	2 0	2 5	0 4
Other foods (purchased baked goods, nuts, fruits, vegetables, etc.)	18 0	3 6	9 0	3 6
Total	155 1	65 1	66 3	16 4

* From *Food Consumption and Dietary Levels of Households in the United States Some Highlights from the Household Food Consumption Survey, Spring, 1955* (Agricultural Research Service, U S Department of Agriculture, ARS 62-6 [Washington Government Printing Office, 1957], 0-433306)

† Estimates of quantities of foods "brought into the kitchen" appear on p 6 in text

TABLE 14

Fat, Fatty Acids, and Cholesterol in Basic Diet Containing 30 Gm. Fat*
(80 Gm Protein, 1,500 Calories)

Food Group	Amount	Calories	Protein (Gm)	Fat (Gm)	Cholesterol (Mg)	Fatty Acids: Saturated (Gm)	Fatty Acids: Polyunsaturated† (Gm)
Skim milk	2 cups	174	17	0 5	1 4	0 21	0 03
Egg	1	77	6	5 5	250 0	1 64	1 48
Lean meat, fish, poultry‡	7 oz	367	40	21	180 0	8 52	2 50
Fruits and vegetables	5 average servings	240	5	1		0 10	0 60
Bread and/or cereals	3 average servings	227	6 5	1 5	2 4	0 34	0 75
Potato and substitutes	2 average servings	220	7	1		0 10	0 60
Sugar and sweets	3 tbsp	165					
Total		1,470	79 5	30 5	442 8	10 91	5 96

[illegible]

[illegible] per week.

TABLE 14A

DESCRIPTION OF DAILY FOOD PLAN: BASIC DIET—30 GM. FAT
(80 Gm. Protein; 1,500 Calories; Derived from Table 14)

Daily Food Plan*	Description
MILK 1 pt. skim	*One pint skim milk* contains 165 *calories*, 17 *gm. protein*, and important amounts of calcium, phosphorus, and the B complex vitamins. One pint buttermilk, made from completely skim milk, or ½–⅔ cup (depending on brand) of non-fat milk solids is equivalent.
EGG	*One egg* contributes approximately 7 *gm. protein and 75 calories.*
MEAT GROUP 7 oz. raw weight (edible portion)	*Seven ounces of lean meat, poultry, or low-fat fish* contribute approximately 40 *gm. protein*, important minerals, and vitamins of the B complex. Liver and eggs are important sources of iron, vitamin A, and the B complex The fat and fatty acid levels indicated in Table 14 may be attained by the use of 7 oz. of lean beef, veal, and lamb 3 times per week; poultry 2 times per week; low-fat fish between 1 and 2 times per week; and liver 1 time in 2 weeks. For methods of preparation see p. 56 in text.
VEGETABLE AND FRUIT GROUP 5 servings	*A dark-green or deep-yellow vegetable* is important each day for its vitamin A value. Asparagus, green beans, broccoli, carrots, green pepper, winter squash, pumpkin, and other greens make up this group. Carrots, winter squash, and pumpkin may contain about 35 *calories* per serving. The others will be negligible. *Other vegetables*, as beets, cabbage, cauliflower, celery cucumber, eggplant, lettuce, mushrooms, onions peas, tomatoes, or turnips, contribute variou amounts of all nutrients. Beets, onions, peas, turnips may contribute about 35 *calories* per ½-c serving. Others will be negligible. *Citrus fruit or other fruit rich in vitamin C* is import each day. One orange or ½ cup juice or ½ grape or 1 cup tomato juice or 1 cup strawberries or 1 red raspberries or ¼ cantaloupe or 1 large tang contains about 40 *calories* per serving and portant amounts of vitamin C.

* See p 56 in text for food preparation.

TABLE 14A—*Continued*

Daily Food Plan*	Description
VEGETABLE AND FRUIT GROUP—*Continued* 5 servings—*Continued*	*Other fruits*, as 1 apple or 1 peach or 1 pear or 4 halves of apricots or 12 grapes or ½ banana, contribute various amounts of all nutrients and contain about *40 calories* per serving. For other fruits see Table 24 in text. If sugar or syrup is included, add between *25 and 50 calories* per serving.
BREAD OR CEREAL 3 servings	One serving provides approximately *70 calories*, important amounts of the vitamin B complex, and iron. One slice enriched or whole-grain bread, ½ cup
POTATO OR SUBSTITUTES 2 servings	white potato, ¼ cup sweet potato, ½ cup cooked macaroni, spaghetti, or noodles, rice, cornmeal, cooked dried peas or beans, ¾ cup flake-type cereal, 2 Graham crackers, or 4 arrowroot cookies.
SWEETS	Three tablespoons sugar, jelly, or honey add approximately *180 calories*.

and herbs instead of fats and oils. Aluminum foil wrapping of meat, poultry, or fish also serves as a convenient method for cooking individual servings which must remain fat-free. In this way meat remains moist and well flavored in addition to being protected from fat, even if placed in the same frying pan with meat for the family.

Salad dressing may be prepared without added oil. Tomato juice or tomato purée may be used as a base, with lemon or vinegar, grated onion, grated celery, garlic, horse-radish, sugar, salt, and pepper added to suit the taste Other seasoning may be used as desired; but oil must be avoided completely. This dressing may be used to marinate meat or may be served hot as a flavoring for cooked vegetables.

Baked goods must be limited to those prepared without added fat, such as angel-food cake, arrowroot cookies, and Graham crackers. Desserts may include gelatin, fruit, fruit whips made from egg white or gelatin, ices, and puddings or frozen desserts prepared from skim milk. Bread may be spread with jam, jelly, or honey.

Olives, potato chips, popcorn, cheese, gravy, or soups containing fat, avocado, nuts, cream, chocolate, and coconut must be re-

TABLE 14B

Menu Pattern and Sample Meals: Basic Diet—30 Gm. Fat
(80 Gm. Protein; 1,500 Calories,* Derived from Tables 14 and 14A)

Daily Food Plan†	Sample Menu Pattern‡	Sample Meals§
Milk	**A.M.**	
1 pt skim		
Egg	½ cup citrus fruit juice or substitute	½ cup orange juice
1	1 egg	Poached egg
	½ cup cooked enriched or whole-grain cereal or ¾ cup flake-type cereal, or 1 slice enriched or whole-grain toast and jelly	Toast Jelly if desired
Meat Group	Coffee or tea if desired	Coffee or tea
7 oz. raw weight of edible portion‖	Skim milk and sugar	Skim milk and sugar
Lean beef, veal, or lamb 3 times per week		
Low-fat fish 1 or 2 times per week	**Noon**	
Poultry 2 times per week		
Liver 1 time in 2 weeks		
Vegetable and Fruit Group	3 oz. lean meat, poultry, or fish	Baked chicken
5 servings	½ cup potato, rice, spaghetti, or noodles	Potato
Dark-green or deep-yellow vegetable is important for vitamin A value	Green or yellow vegetable	Frozen greens
Citrus fruit or other fruit rich in vitamin C is important daily	Other vegetable	Cabbage and green pepper slaw§
	Fruit	Honeydew melon
	1 glass skim milk	Skim milk
	1 slice enriched or whole-grain bread with jelly	Bread and jelly
Bread or Cereal	**P.M.**	
3 servings	4 oz. lean meat, poultry, fish, or liver	Liver, baked in tomato sauce§
Potato or Substitute	½ cup potato, rice, spaghetti, or noodles	Rice with chives
2 servings	Vegetable	Tossed salad with special dressing§
	Fruit	Baked apple
Sugar	1 glass skim milk	Skim milk
Jelly or honey, 3 tablespoons	1 slice enriched or whole-grain bread and jelly	Bread and jelly

* If more calories are needed, the following may be included without significant alteration of fatty acids: 1 teaspoon sugar, jelly, or honey, 20 calories, ½ cup plain gelatin dessert or 1 serving sweetened fruit, 100 calories

† For variety within each food group see Table 14A for alternates

‡ For foods to avoid, see p. 56 in text

§ See p. 56 in text for discussion of food preparation

‖ Based on weekly selection of 420 gm. chicken, 315 gm. low-fat fish, 105 gm. liver, and 210 gm. each of lean beef, veal, or lamb.

stricted. Labels on canned or processed foods must be examined carefully to note any fat content.

Fatty acid modifications.—If the prescribed levels of saturated or unsaturated fatty acids permit of adding fats and oils in the diet, these may be incorporated in cooking, in the salad dressing, as a spread for bread and potatoes, or in a beverage made from the egg

TABLE 15*

TYPICAL FATTY ACID ANALYSES OF SOME FATS OF ANIMAL AND PLANT ORIGIN†

	SATURATED			UNSATURATED		
	Palmitic	Stearic	Other‡	Oleic	Linoleic	Other
Animal fats:						
Lard.....	29 8	12 7	1 0	47 8	3 1	5 6§
Chicken ..	25 6	7 0	0 3	39 4	21 8	5 9§
Butterfat	25 2	9 2	25 6	29 5	3 6	7 2§
Beef fat	29 2	21 0	3 4	41 1	1 8	3 5§
Vegetable oils:						
Corn	8 1	2 5	0 1	30 1	56 3	2 9
Peanut	6 3	4 9	5 9	61 1	21 8	. . .
Cotton seed	23 4	1 1	2 7	22 9	47 8	2 1
Soybean	9 8	2 4	1 2	28 9	50 7	7 0‖
Olive	10 0	3 3	0 6	77 5	8 6	.
Coconut	10 5	2 3	78 4	7 5	Trace	1 3

* Committee on Fats, *The Role of Dietary Fat in Human Health* (Food and Nutrition Board, National Academy of Sciences–National Research Council, Publication No 575 [1958])

[illegible]

[illegible]

§ Mainly hexadecenoic acid, 0 2–0.4 per cent arachidonic acid

‖ Mostly linolenic acid

and skim milk allotted on the basic diet Special recipes and suggestions for the incorporation of a particular fat or oil into menus have been discussed by Vail (6) and Brandt (7).

Numerous special-purpose cookbooks have also been published. However, the suitability of a recipe depends on the particular level of fat, the percentage of fat calories, or the proportion of saturated and unsaturated fatty acids prescribed in the individual diet. For this reason, the physician, dietitian, or nutritionist should aid in selecting appropriate recipes.

For a description of a daily food plan, a sample menu pattern, and

sample meals containing 30 gm. fat, see Tables 14A and 14B. Modifications from this basic diet may be made to suit individual needs.

REFERENCES

1. Household food consumption survey, 1955. (U.S. Department of Agriculture, "Agricultural Research Service Reports," Nos. 1–10.) 1957.
2. STIEBELING, HAZEL K. (director, Institute of Home Economics, U.S. Department of Agriculture, Agricultural Research Service). Food and nutrient consumption trends and consumer problems: talk at the American Institute of Nutrition, Chicago, Illinois, April 17, 1957. (Mimeo.)
3. STEFANIK, P. A., and TRULSON, M. F. Modifying the fatty acid content of the diet, J. Am. Dietet. A., 34:591–95, 1958.
4. HAYES, O. B., and ROSE, G. Supplementary food composition table, J. Am. Dietet. A., 33:26–29, 1957.
5. HARDINGE, M. G., and CROOKS, H. Fatty acid composition of food fats, J. Am. Dietet. A., 34:1065–71, 1958.
6. VAIL, GLADYS E. Cooking with fats high in polyunsaturated fatty acids, J. Am. Dietet. A., 35:119–21, 1959.
7. BRANDT, M. BERTHA. Palatable ways to combine oil with egg-milk mixtures. J. Am. Dietet. A., 35:121, 1959.
8. GODDARD, VERZ R., and GOODALL, LOUISE. Fatty acids in food fats. (Agricultural Research Service, U.S. Department of Agriculture, "Home Economics Research Reports," No. 7.) March, 1959.

Chapter 7 | Protein Modifications

The normal food allowance may be modified in terms of a prescribed level of protein, the kind and amount of amino acids, or the character of the protein fraction.

125-GM. PROTEIN DIET

A level of protein above the normal allowance may be indicated most clearly if it is prescribed in terms of grams of protein per kilogram of desirable weight. For the normal, healthy adult, 1 gm. protein per kilogram of desirable weight has been recommended (Table 3). For children, the level will be correspondingly higher per unit of weight (Table 3) For therapeutic purposes, appropriate increases should be specified.

In evaluating proteins, one considers two general aspects: (*a*) digestibility and (*b*) biologic value. By "digestibility" is meant the percentage of the consumed protein, measured in terms of nitrogen, that is absorbed. "Biologic value" means the percentage of absorbed nitrogen that is retained by the body and not excreted in the urine The body requires a definite combination or pattern of amino acids, each in proper amount, for the formation of tissue proteins. If any essential amino acid is supplied in insufficient amounts, then this amino acid will limit the amount of tissue protein made; other amino acids, regardless of the amount present, can be used only to the extent that is required for this tissue protein, and the rest present will be metabolized and the nitrogen excreted in the urine; therefore, the proteins deficient in essential amino acids will have low biologic

TABLE 16—NUTRITIONAL EVALUATION OF 125-GM. PROTEIN DIET
(2,100 Calories*)

Daily Food Intake	Quantity		Calories†	Foodstuffs			Minerals		Vitamins				
	Weight (Gm)	Approximate Measure		Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Ca (Gm)	Fe (Mg)	A (I U)	Ascorbic Acid (Mg)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Equivalent (Mg)
Milk, skim, fluid ..	984	1 qt.	330	34		48	1 21	1 0	Trace	10	0.39	1.77	9 2
Milk, non-fat solids.	100	1–1⅓ cups	330	34		48	1.21	1.0	30	10	0 39	1.77	9.2
Meat, poultry, fish, lean, cooked, or cheese‡ .	120	4 oz E.P	300	28	20		0 10§	3 8	6,610	4	0 27	0.74	10.8
Bread, whole-grain or enriched white.	180	6 slices	480	16	6	90	0 16	3 6	.		0.48	0 26	6.6
Cereal, whole-grain or enriched white	20	¾ cup	80	3	1	15	0 03	0 6	...	..	0 08	0 04	0.8
Potato, cooked	200	2 small	170	4		38	0 02	1 4	40	28	0.18	0.06	2.6
Vegetable, green or yellow‖	100	½ cup	30	2		5	0 09	1 3	6,280	30#	0 08	0.15	1 3
Vegetable, other**	200	1 cup	50	2		10	0 06	1 0	450	30#	0 09	0.10	1.0
Fruit, citrus	100	1 serving††	40	1		10	0 02	0 2	110	45	0 05	0 02	0 2
Fruit, other		2 servings††	80			20	0 03	0 9	1,905	35	0.08	0 09	0 9
Subtotal‡‡..			1,890	124	27	284	2 93	14 8	15,425	192	2.09	5 00	42.6
Sugar .	15	3 level teaspoons	60			15	...	...	...	...	...	...	...
Fats or oils. .	15	3 level teaspoons	135	...	15	...	...		165	.	...	...	...
Total‡‡ ...			2,085	124	42	299	2 93	14 8	15,590	192	2 09	5 00	42.6

* To meet additional caloric needs, further amounts of the above foods may be used plus other sugars and starches (see Tables 35 and 36).

† Calories have been rounded off to nearest 5

‡ *Weighted on average food consumption data (except liver) If 2½ oz liver are not used weekly*, the vitamin A value and ascorbic acid must be discounted completely

§ If 4 oz Cheddar type cheese are not used during a 10-day period, an additional 100 gm milk daily will supply equivalent calcium

‖ Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, spinach, turnip greens, and other greens.

For canned vegetables, reduce by half

** Tomato, fresh, canned, or juice; vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage, and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower

†† Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values, as in Table 24.

‡‡ Minerals, vitamins, and protein will approximate the Recommended Dietary Allowances (Table 3) for the normal adult

gen equilibrium in young adult males. In addition, a committee of the Food and Agriculture Organization of the United Nations (7) has recently appraised protein requirements.

Tryptophan has become the first amino acid for which an allowance has been indicated by the Food and Nutrition Board in the *Recommended Dietary Allowances, Revised, 1958* (11). Its sparing action on the need for niacin has been quantitated in terms of 60 mg. tryptophan: 1 mg. niacin. Horwitt (8) has discussed the basis for this assumption and its application to the evaluation of dietaries. This may be of particular importance in situations where food patterns have become skewed either for therapeutic reasons or from unusual food habits on the part of the patient.

Phenylalanine is another amino acid which has become of particular interest. Certain mentally retarded children fail to oxidize this amino acid as a result of an enzyme deficiency, and improvement has been brought about in some cases by reducing the phenylalanine in the diet to minimal levels. Wright (9) and Zellweger (10), among others, have reviewed some of the recent developments in the treatment of this disease in infants and children.

In planning a phenylalanine-restricted diet, special consideration must be given to the protein portion of the diet, since natural proteins contain between 4 and 6 per cent phenylalanine. Several methods have been used to bring about a reduction in the phenylalanine content of the diet. Armstrong (11) has used a mixture of pure amino acids to compose the protein portion of the diet. Others (9) have used a hydrolysate of casein which has been passed through a column of activated charcoal. In this way, tyrosine and tryptophan are removed, in addition to the phenyalanine. Another product, a "breast-milk type formula," is suitable for use in infancy and early childhood. When reconstituted in "normal dilution," it is said to provide nutrients in amounts usually found in breast milk. Since certain of these products provide only the protein portion of the diet or the protein and minerals, it is important to note which nutrients are supplied and which must be added to provide a mixture of greatest nutritional sufficiency.

The use of the "breast-milk type formula" in a diet for a ten-

month-old child is outlined in Table 17, from Karle, O'Donnell, and Ehmke (12).

Recently, new and less costly methods of assay of the amino acid content of foods have resulted in a substantial accumulation of data. These have been compiled by Orr and Watt (13) for eighteen amino acids in 202 food items, both in terms of amino acids per gram of total nitrogen and in terms of amino acids in 100 gm. food. A portion of the original table on the average amount of amino acids per 100 gm. food appears in Table 43 (p. 160), including the eight "essential amino acids" which are necessary for maintenance of body tissue plus arginine and histidine, which have been found to be important for growth.

TABLE 17

MAINTENANCE DIET* FOR A PHENYLKETONURIC CHILD AGED TWELVE MONTHS (12)

FEEDING	QUANTITY	LOFENALAC MEASURES§	CALORIES†		PROTEIN†		PHENYLALANINE‡	
			Food	Lofenalac	Food† (Gm.)	Lofenalac (Gm.)	Food‡ (Mg.)	Lofenalac (Mg.)
Breakfast								
orange juice	½ cup	1	32	43	0.4	1.42	20	8
puréed fruit	½ cup	2	38	86	0.2	2.84	10	16
cereal‖	½ cup	2	34	86	1.0	2.84	50	16
Mid-morning feeding								
water, 7 Up, or lemon juice plus water	½ cup	2	4	86	0.1	2.84	5	16
Noon feeding								
puréed fruit	½ cup	2	77	86	0.4	2.84	20	16
puréed yellow vegetable	½ cup	2	20	86	0.5	2.84	25	16
Mid-afternoon feeding								
prepared gelatin plus water	1 tbsp ½ cup	1	40	43	1.0	1.42	50	8
whipped cream	1 tbsp	1	52	43	0.3	1.42	15	8
Evening feeding								
puréed green vegetable	½ cup	2	9	86	0.6	2.84	30	16
puréed fruit	½ cup	2	77	86	0.4	2.84	20	16
Bedtime feeding								
fruit juice	½ cup	1	64	43	0.1	1.42	5	8
Vitamin supplement	0.6 cc							
Total		18	447	774	5.0	25.66	250	144

* The food and Lofenalac supply quantities of vitamins and minerals which meet the Recommended Dietary Allowances (Table 3) for a child of this age, with the exception of riboflavin. A daily dosage of Zymadrops provide additional nutrients, including 1 mg. riboflavin.

† Mean values for calories and protein were calculated from food tables (19) for fruit and vegetable exchanges commonly consumed by children of this age.

‡ The phenylalanine content of foods was estimated to approximate 5 per cent of total protein (11). Lofenalac contains approximately 8 mg. phenylalanine per measure.

§ One measure of powder weighs 9.45 gm.

‖ For preparation of the cereal, the Lofenalac may be mixed with water to supply a liquid for moistening, or fruit juice may be used instead of the fruit. In substituting other grain products for the cereal, the low-phenylalanine commercial powder may be added to 1 tsp. kosher margarine, honey, jelly, or apple butter once daily. Gluten low products contain restricted amounts of protein, thus the quantities used for cereal substitutions may be adjusted accordingly.

Chapter 8 | *Modifications in Protein-Fat-Carbohydrate*[1]

For the purpose of working toward the standardization of values on food composition in the dietary management of diabetes, the American Diabetes Association in 1947 invited The American Dietetic Association to select a committee to work jointly with its Committee on Education. Since the work of the Diabetes Section of the U.S. Public Health Service is so intimately concerned with these matters, it joined in this project to become the third co-operating organization. The objectives of this joint committee were to prepare a set of representative values suitable for use in dietary calculation and to develop a simplified method for planning the diet, including several "exchange lists" of foods of similar food value.

The joint committee was faced with many difficulties due in part to a lack of uniformity in the composition of food occurring as a result of varietal differences, variations in conditions of growth, degree of maturity, and methods of harvesting, storage, or preparation For example, two different types of peaches may vary as much as 125 per cent in carbohydrate content. The composition of a piece of well-done meat will be roughly 25 per cent higher in protein than a piece which is rare, owing to a difference in water content. The carbohydrate content of bread will fluctuate, depending upon its age

1. Report of the Committee on Diabetic Diet Calculations, The American Dietetic Association. Prepared co-operatively with the Committee on Education, American Diabetes Association, and the Diabetes Section, U S. Public Health Service. Compiled by Elizabeth K. Caso.

and the way it has been stored (1). McCance and Widdowson (2) have pointed out that an appreciable amount of carbohydrate may be lost in the cooking of vegetables. American food tables (3, 4) report "total carbohydrate" values which are considered to contain a varying percentage of unavailable carbohydrate (5). All these factors had to be considered carefully and weighted in preparing figures for calculating diabetic diets.

On the other hand, there is a great variation from day to day in bodily requirements and utilization of food which is dependent on such factors as activity, emotional status, and insulin dosage. In fact, differences in bodily needs far exceed differences in food composition and therefore minimize the problem of the inevitable variation in food content. Thus nothing more than reasonable detail is justifiable in calculating diabetic diets. As a result, foods have been grouped in terms of similarity in composition.

FOOD EXCHANGE LISTS

Recognizing these facts, the joint committee has submitted the food values given in Table 18. As mentioned above, the list is

TABLE 18

FOOD VALUES FOR CALCULATING DIABETIC DIETS

Group	Amount	Weight (Gm.)	Carbohydrate (Gm.)	Protein (Gm.)	Fat (Gm.)	Energy (Calories)
Milk, whole	½ pt	240	12	8	10	170
Vegetable, group A	As desired					.
Vegetable, group B	½ cup	100	7	2		36
Fruit	Varies		10			40
Bread exchanges	Varies		15	2		68
Meat exchanges	1 oz	30		7	5	73
Fat exchanges	1 teaspoon	5			5	45

greatly abbreviated by combining foods of similar composition into food exchange lists.

Milk.—In rounded figures, the composition of 1 cup (8 oz.) of whole fresh milk averages 12 gm carbohydrate, 8 gm. protein, and 10 gm. fat (4). One cup or ½ pt. is purposely used as the unit of measurement, since milk in most sections of this country is purchased by the quart. Thus ½ pt. is relatively easy for the patient to

measure, and any multiple of ½ pt. can be figured into the meal plan for the day. This is much simpler than prescribing odd amounts, such as 7 or 14 oz. per day.

Several forms of cow's milk are available, such as evaporated, dried, or skim milk. These types of milk have been combined into one table called "List 1—Milk Exchanges" (Table 19). In the amounts listed, one may be substituted for another, since they are all approximately equal in composition.

Problems of measuring carbohydrate.—Innumerable lists have been prepared which classify vegetables according to the amount of carbohydrate they contain. In some instances, vegetables have been

TABLE 19

LIST 1—MILK EXCHANGES

(Per Serving: Carbohydrate, 12 Gm.; Protein, 8 Gm ; Fat, 10 Gm.)

Type of Milk	Approximate Measure	Weight (Gm)
Whole milk (plain or homogenized)...	1 cup (8 oz.)	240
Skim milk*	1 cup	240
[illegible]	½ cup	120
[illegible]	¼ cup	35
Powdered skim milk (nonfat dried milk)*.	¼ cup	35
Buttermilk (from whole milk)	1 cup	240
Buttermilk (from skim milk)*.. . ..	1 cup	240

* Since these forms of milk contain no fat, two fat exchanges may be added to the diet when they are used.

divided into lists containing approximately 3, 6, 9, and 12 per cent carbohydrate. In others, they have been grouped as 5, 10, or 15 per cent vegetables. One author might place a vegetable in the 6 per cent group while another might include it in the 3 per cent list. There has been little uniformity in this matter. In addition, the percentage classification has been difficult for the patient to comprehend and to put into practical use.

In seeking some simpler manner of grouping the vegetables, the committee took into account the controversy regarding "total" and "available" carbohydrate. According to the Department of Agriculture (3), " 'total' carbohydrate in the majority of cases is reckoned as carbohydrate by difference, that is, as the difference between 100 per cent and the sum of the percentages of water,

protein, fat, and ash. This measure includes starch, dextrin, and sugars, and is to this extent an approximate measure of the total carbohydrate that can be utilized by the body. However, it tends to over-estimate the available carbohydrate since it also includes crude fiber and organic acids, when present, and any undetermined solids." The American Diabetes Association, upon the recommendation of W. H. Olmsted, has defined available carbohydrate as follows (5): "This term includes starch, dextrin, glycogen, glucose, fructose, galactose, sucrose, lactose, and maltose. It represents the portion of the carbohydrate of foods available to the human body for glycogen formation." That organization feels that available carbohydrate is the preferred value for computing diabetic diets.

There is evidence to show that cellulose, hemicellulose, and gums are broken down by bacterial action in the human intestinal tract to form volatile fatty acids (5, 6) which do enter into glycogen formation. However, isotopic studies of the intermediary metabolism of volatile fatty acids (7–10) seem to indicate that they do not cause a *net* increase in the body's supply of glycogen.

The organic acids, chiefly malic and citric, are converted to glucose. In each case, two molecules of citrate or malate form one of glucose. Altogether, the total amount of glucose formed from organic acids is variable. Some workers believe that it is negligible. More studies in this field are needed (5).

These studies of the availability of fractions making up "total-carbohydrate-by-difference" are very complex. Bernice K. Watt, of the Bureau of Human Nutrition and Home Economics, Department of Agriculture, feels that it may be a long time before the ideal in food analysis is reached, with not only quantitative data but data on human utilization available for the separate components of the so-called "carbohydrate-by-difference"

The question then arises as to the advisability of using values for starch and sugar alone as the measure of the carbohydrate content of vegetables and fruits. Dr. Watt has stated, after reviewing data in the bureau files, that, for a fair number of fruits, the analyses for sugar and starch appear to be as representative of the product as were estimates of total carbohydrate. For some fruits and many vegetables this is not the case, since products selected for study of sugar or starch content were not always ordinary products but were

often selected for study because of some particular characteristic or condition of growth. The Department of Agriculture is currently accumulating considerable data on the carbohydrate fractions of foods.

Furthermore, McCance and Widdowson (2) report a loss of carbohydrate in the cooking process. Although the analyses were done on English foods and have not been, to any extent, carried out on American foods, at least the findings are significant and would tend to justify the use of lower values for carbohydrate content.

This whole problem resolves itself into the need for some practical basis to use for the calculation of carbohydrate in diabetic diets. After some consideration, the joint committee finally recommended the figures for starch and sugar as representative of available carbohydrate, even though they may be short of the ideal.

Classification of vegetables.—In Table 20 are summarized the data used to arrive at a simplified grouping of the more commonly used vegetables.

The first group of vegetables (group A) contains 3 gm. or less of carbohydrate per 100-gm. serving. Therefore, the committee recommends that these vegetables be grouped in one list (Table 21) and that the negligible amount of carbohydrate which they contain need not be figured in the diet unless more than 200 gm. is used at a meal.

The second group of vegetables in Table 20 contains more carbohydrate. Some of them are more popular than others. Therefore, a weighted average was taken (Table 22), and, based on these data, the committee decided to figure the composition of these vegetables as 7 gm carbohydrate and 2 gm. protein per 100-gm. serving.

Although the list of group B vegetables is short, it contains some of the more popular vegetables. However, it is not likely that more than one of these vegetables would be eaten in one day. The dietitian who has previously figured three or more vegetables in the diet may now find that she needs to calculate only one group B vegetable and allow the patient other vegetables from group A as desired

The remainder of the vegetables in Table 20 contains appreciably more carbohydrate. For simplicity they are included in the list of bread exchanges and will be considered later. None of the other lists represents as major a change as this new classification of vegetables (Table 21).

TABLE 20

CARBOHYDRATE CONTENT OF VEGETABLES PER 100-GM. SERVING

Food	Source of Reference		
	U S Dept of Agriculture (3) (Sugar and Starch) (Gm/100 Gm)	McCance and Widdowson (2) (Gm/100 Gm)	Williams *et al.* (11) (Gm/100 Gm)
	List 2, Group A—Vegetable Exchanges		
Asparagus	1.7	1.1	..
Beans, string, young	2.6	2.9	5.8
Beet greens	0.5	.	..
Broccoli	1.9	0.4 (tops)	1.1
Brussels sprouts	..	1.7	2.6
Cabbage	3.5	3.0	2.5
Cauliflower	2.6	1.2	1.0
Celery	1.2	1.3	...
Chard	0.8	.	..
Chicory	0.2	.	..
Cucumber	2.6	1.8	..
Dandelion greens	0.9	..	..
Eggplant	..	3.1	..
Kale	1.4	.	.
Lettuce	1.6	1.8	1.4
Mushrooms	0	0	..
Mustard greens	0.4	0.9	..
Radishes	3.4	2.8	.
Spinach	0.3	1.4	0.7
Squash, summer	1.2		..
Tomatoes	3.4	2.8	1.6
	List 2, Group B—Vegetable Exchanges		
Beets	9.6 (total CHO)	9.9	7.3
Carrots	7.5	5.4	6.0
Onions	7.2	5.2	.
Peas, green	9.0	10.6	8.3
Pumpkin	5.1	3.4	.
Rutabaga	6.7	.	.
Squash, winter	4.9	.	
Turnip	4.6	3.8	3.5
	List 4—Bread Exchanges		
Beans, baked	18.8	17.3	..
Beans, dried	62.1 (total CHO)	..	..
Beans, Lima	23.5	..	..
Corn	18.9	..	14.8
Parsnips	11.9	11.3	.
Peas, dried	45.1	50.0 (raw) 19.1 (cooked)	..
Potato, white	15.6	18.3	16.4
Potato, sweet	25.6	20.1	23.7

TABLE 21

LIST 2—VEGETABLE EXCHANGES

Group A

Negligible Carbohydrate, Protein, and Calories if 1 Cup (200 Gm.) or Less Is Used

Asparagus	Eggplant	Lettuce
Beans, string, young	Greens*	Mushrooms
Broccoli*	Beet	Okra
Brussels sprouts	Chard, Swiss*	Pepper*
Cabbage	Collard	Radish
Cauliflower	Dandelion	Sauerkraut
Celery	Kale	*Squash, summer*
Chicory*	Mustard	Tomatoes*
Cucumbers	Spinach	Watercress*
Escarole*	Turnip	

Group B

Per Serving: Carbohydrate, 7 Gm.; Protein, 2 Gm.
(1 Serving = ½ Cup = 100 Gm)

Beets	Peas, green	Squash, winter*
Carrots*	Pumpkin*	Turnip
Onions	Rutabaga	

* These vegetables have high vitamin A value. At least one serving should be included in the diet each day.

TABLE 22

DATA USED TO CALCULATE THE COMPOSITION OF VEGETABLES, GROUP B

Food	Carbohydrate Content (Starch and Sugar)* (Gm/100 Gm)	Weighting (Based on Usual Rate of Consumption)†
Beets	8.0	3
Carrots	7 5	4
Onions	7.2	1
Peas, green (medium)	9.0	4
Pumpkin	5 1	...
Rutabaga	6 7	½
Squash, winter	4.9	2
Turnip	4 6	1

* U S Department of Agriculture figures (3)

† From *Family Food Consumption in the United States, Spring, 1942* (18) and *Consumption of Food in the United States, 1909–48* (12).

Fruit.—The carbohydrate content of fruit differs with the variety as in vegetables, and fruits have been classified into groups according to their carbohydrate content. To avoid the confusion of having several groups and to simplify dietary instruction for the patient, the practice in the past few years (13, 14) has been to list all fruits together in *amounts* that would supply either 10 or 15 gm. carbohydrate. The committee working on the material was in favor of the list (Table 23) which contained 10 gm. carbohydrate, since it presented the majority of the more common fruits in serving sizes that are easy to purchase, economical to serve, and relatively satisfying in amount. The carbohydrate values of the fruits are based on the starch and sugar analyses of the Department of Agriculture (3). For practicality the figures were rounded

In Table 24 the fruits have been listed in household measurements. Since each fruit in the amount listed contains approximately 10 gm. carbohydrate, one may be exchanged for the other. There is some variation between measured and weighed portions of fruit. Every so-called "small" apple will not weigh exactly 80 gm Here again, however, the variation seems reasonable on the basis of the difference in actual carbohydrate content of each food.

Bread, cereals, and vegetables of high carbohydrate content.—Again, it was obvious that if many foods of high carbohydrate content could be included in the one list of bread exchanges, it would be much easier for all those concerned with the planning of diabetic diets Many lists of this sort have been prepared by other groups. The joint committee agreed upon the list given in Table 25, which includes several types of breadstuffs, a number of cereals, different varieties of crackers, and the vegetables with the highest carbohydrate content, as shown in Table 20.

Although the average slice of bread may weigh 25 gm and contain approximately 13 gm. carbohydrate, it was decided that it would be preferable to list all the foods in this group in amounts that contain approximately 15 gm. carbohydrate. A ½-cup serving of many of these foods, which is an easy quantity to measure, yields this amount of carbohydrate. During the course of a day, an individual who is allowed six bread exchanges, for example, is likely to select several different foods from List 4, such as potato, cereal, or crackers. The average typical day's consumption of bread exchanges is therefore approximately 15 gm. carbohydrate per serving.

TABLE 23

AMOUNT OF FRUIT SUPPLYING
10 GM. CARBOHYDRATE

Food	Source of Reference	
	U.S. Dept of Agriculture (3) (Gm.)	Joint Committee's Recommendations (Gm.)
Apple	97	80
Applesauce	126	100
Apricots, fresh	96	100
Apricots, dried	22	20
Banana	52	50
Blackberries	164	150
Blueberries	103	100
Canteloupe	238	200
Cherries	75	75
Dates	16	15
Figs, fresh	62	50
Figs, dried	18	15
Grape juice	60	60
Grapefruit	154	125
Grapefruit juice	118	100
Grapes	67–87	75
Honeydew melon	143	150
Mango	73	70
Orange	113	100
Orange juice	111	100
Papaya	111	100
Peach	114	100
Pear	112	100
Pineapple	84	80
Pineapple juice	83	80
Plums	120	100
Prunes, dried	24	25
Raisins	16	15
Raspberries	139	150
Strawberries	189	150
Tangerines	115	100
Watermelon	167	175

TABLE 24

List 3—Fruit Exchanges*
(Carbohydrate—10 Gm. per Serving)

Food	Approximate Measure
Apple (2-in. diameter)	1
Applesauce	½ cup
Apricots	
Fresh	2 medium
Dried	4 halves
Banana	½ small
Blackberries	1 cup
Blueberries	⅔ cup
Cantaloupe (6-in. diameter)†	¼
Cherries	10 large
Dates	2
Figs, fresh	2 large
Figs, dried	2
Grape juice	½ cup
Grapefruit†	½ small
Grapefruit juice†	½ cup
Grapes	12
Honeydew melon (7-in. diameter)	⅛
Mango	½ small
Orange†	1 small
Orange juice†	½ cup
Papaya	⅓ medium
Peach	1 medium
Pear	1 small
Pineapple	½ cup
Pineapple juice	⅓ cup
Plums	2 medium
Prunes, dried	2 medium
Raisins	2 tablespoons
Raspberries	1 cup
Strawberries†	1 cup
Tangerine	1 large
Watermelon	1 cup

* Unsweetened canned fruits may be used in the same amount as listed for the fresh fruit.

† These fruits are rich sources of ascorbic acid. At least one serving should be included in the diet each day.

TABLE 25

LIST 4—BREAD EXCHANGES

(Per Serving: Carbohydrate, 15 Gm.; Protein, 2 Gm.)

Food	Approximate Measure	Weight (Gm.)
Bread:	1 slice	25
biscuit, roll (2-in. diameter)	1	35
muffin (2-in. diameter)	1	35
cornbread (1½-in. cube)	1	35
Flour	2½ tablespoons	30
Cereal:		
cooked	½ cup	100
dry (flake and puffed)	¾ cup	20
rice and grits, cooked	½ cup	100
Spaghetti and noodles, cooked	½ cup	100
Crackers:		
graham (2½-in. square)	2	20
oysterettes	20 (½ cup)	20
saltines (2-in. square)	5	20
soda (2½-in. square)	3	20
round, thin (1½-in. diameter)	6–8	20
Vegetables:		
beans and peas, dried, cooked (Lima, navy, split pea, cowpeas)	½ cup	100
beans, Lima, fresh	½ cup	100
beans, baked, no pork	¼ cup	50
corn, sweet	⅓ cup	80
corn, popped	1 cup	20
parsnips	⅔ cup	125
potatoes, white—baked or boiled (2-in. diameter)	1	100
potatoes, white—mashed	½ cup	100
potatoes, sweet or yams	¼ cup	60
Sponge cake, plain (1½-in. cube)	1	25
Ice cream (omit 2 fat exchanges)	½ cup	70

Meat, fish, poultry, eggs, and cheese.—The foods which are high in protein have been listed in amounts that are equal in protein and fat content to approximately 1 oz. meat. It was noted that the method or preparation or the cut of the meat (rib or rump) will influence the protein and fat content. Also, some forms of cheese are higher in fat than others as a result of the type of milk (whole or skim) used in their preparation. Some varieties of fish (cod versus mackerel) contain more fat than others. In a mixed diet, these differences become minimized. After reviewing the dietary analyses of these foods, the committee recommended the list of meat exchanges given in Table 26 and the figures of 7 gm protein and 5 gm fat per unit of exchange.

TABLE 26

LIST 5—MEAT EXCHANGES
(Per Serving. Protein, 7 Gm.; Fat, 5 Gm)

Food	Approximate Measure	Weight (Gm.)
Meat and poultry, medium fat (beef, lamb, pork, liver, chicken)	1 oz.	30
Cold cuts (4½ in. square, ⅛ in thick)	1 slice	45
Frankfurter (8 or 9 per lb.)	1	50
Fish:		
cod, mackerel	1 oz.	30
salmon, tuna, crab	¼ cup	30
oysters, shrimp, clams	5 small	45
sardines ..	3 medium	30
Cheese:		
Cheddar or American	1 oz.	30
cottage	¼ cup	45
Eggs ..	1	50
Peanut butter*	2 tablespoons	30

* Limit use or adjust carbohydrate (deduct 5 gm carbohydrate per serving when used in excess of one exchange)

Diets which include odd amounts of meat, such as 75 or 105 gm., are difficult to measure. Servings of 1, 2, or 3 oz., for example, are more practical for the patient, since the food is usually purchased in these amounts. This factor was taken into consideration in preparing this list.

Fats.—The problem of arriving at a figure for the composition of

fats was relatively simple, since there are fewer variable factors in volved. The joint committee accepted the value of 5 gm. fat per fa exchange. The list (Table 27) contains foods that are approximatel equal in fat content.

These six exchange lists (Tables 19, 21, 24, 25, 26, and 27) will al low the patient great variety in his diet and permit him to selec foods from the different groups that may suit his income and foo habits. The lists should also help to establish some uniformity i dietary instruction and counteract a practice that has no scientifi basis, that of excluding various foods, such as potato, certain fruits and some other foods, from the diet.

TABLE 27

LIST 6—FAT EXCHANGES
(Fat—5 Gm. per Serving)

Food	Approximate Measure	Weight (Gm.)
Butter or margarine	1 teaspoon	5
Bacon, crisp	1 slice	10
Cream:		
light, 20%	2 tablespoons	30
heavy, 40%	1 tablespoon	15
Cream cheese	1 tablespoon	15
French dressing	1 tablespoon	15
Mayonnaise	1 teaspoon	5
Oil or cooking fat	1 teaspoon	5
Nuts	6 small	10
Olives	5 small	50
Avocado (4-in. diameter)	⅛	25

Special considerations.—The following foods contain negligible amounts of carbohydrate, protein, and fat and may therefore be used as desired in the diet:

Coffee
Tea
Clear broth
Bouillon
Gelatin, unsweetened
Rennet tablets
Cranberries
Lemon
Rhubarb
Mustard
Pickles, sour
Pickles, dill—unsweetened
Saccharin
Pepper
Spices
Vinegar

"Specialty" foods for diabetic patients are not rec They are expensive, the information on the package is leading, and the patient can usually eat all the natural foo cereals, unsweetened fruits, vegetables) in the amount sp his diet outline.

CALCULATION OF THE DIABETIC DIET

By using the short list of food values given in Table 18, i possible to calculate diet prescriptions with considerable ea simplicity, taking into account the amount of each of thes groups which the patient should eat. This simplicity in calcula diet will result in the saving of time for both the physician ar dietitian. The patient will also benefit immeasurably by a diet is made to suit his food habits. Variety in the diet will be achi by using the food exchange lists (Tables 19, 21, 24, 25, 26, and

The nutritive adequacy of the diet will be assured by including same *basic foods* that are recommended for the normal individu These include the following:

Milk	1 pt for adults, 1 qt for children
Meat, fish, poultry, eggs, and cheese	4–5 oz.
Whole-grain or enriched cereal or bread	To meet caloric needs
Fruit—one a citrus fruit or tomato	2 servings
Vegetables—one green or yellow	2 servings
Fat or oil	To meet caloric needs

The actual calculation of the diet can be reduced to a simple formula, as shown in the tabulation on p. 84 To determine the number of servings of bread, meat, and fat exchanges required to complete the diet prescription, it is necessary only to:

a) Subtract the number of grams of carbohydrate (61 in the example in the table) furnished by the other sources of carbohydrate from the amount prescribed (180) and divide the result by 15, the number of grams of carbohydrate in one serving of bread exchange, as noted in List 4

b) Adjust the amount of protein in the diet to the prescription by subtracting the number of grams of protein (34 in the example) supplied by milk, vegetables, and bread exchanges from the amount prescribed (80) and dividing the remainder by 7, the amount of protein in each meat exchange

c) Follow the same procedure with regard to fat, except to divide the result by 5, the number of grams of fat in one serving, as noted in List 6.

The diet is figured to coincide as closely as possible with the prescription. However, it is not practical to split bread or meat exchanges into halves or to add extra fruits and vegetables if the patient does not care for larger amounts. Therefore, the carbohydrate may vary as much as 7 gm. from the amount ordered, and the protein may differ by 3 gm. The fat will agree closely with the prescription, since the figures for fat are all in multiples of 5.

PROCEDURE FOR CALCULATING A DIABETIC DIET (15)

Sample Prescription

Carbohydrate	180 gm.
Protein	80 gm.
Fat	70 gm.
Calories	1,700

	Amount	Carbohydrate (Gm.)	Protein (Gm.)	Fat (Gm.)
Milk, whole (List 1)	1 pt.	24	16	20
Vegetables (List 2, Group A)	As desired	.	.	..
Vegetables (List 2, Group B)	1 serving	7	2	..
Fruit (List 3)	3 servings	30	..	..
Total carbohydrate from sources other than bread exchanges		61		
180 gm. carbohydrate in prescription − 61 gm. from sources other than bread exchanges 119 ÷ 15 = 8 bread exchanges				
Bread exchanges (List 4)	8 servings	120	16	
Total protein from sources other than meat exchanges	..	...	34	
80 gm. protein in prescription −34 gm. from sources other than meat exchanges 46 gm. ÷ 7 = 7 meat exchanges				
Meat exchanges (List 5)	7 servings		49	35
Total fat from sources other than fat exchanges	..	...	..	55
70 gm. fat in prescription −55 gm. from sources other than fat exchanges 15 gm. ÷ 5 = 3 fat exchanges				
Fat exchanges (List 6)	3 servings			15
		181	83	70

DIVISION OF FOOD INTO MEALS

Division of the total amount of food prescribed into meals should be worked out with the patient. In doing this, several factors must be considered:

a) Present meal patterns, which are usually related to such factors as occupation, working hours, and place of eating.

b) Diabetic condition, i.e., tendency to excrete more or less sugar at varying times during the day.

c) Type of insulin—regular, protamine zinc, globin, or Lente.

The carbohydrate content of the diet should be divided between the meals, avoiding too large a proportion of the total at any one meal. When protamine insulin is used, nourishment at bedtime (perhaps one-seventh of the day's allowance of carbohydrate) should be recommended. When globin insulin is used, also give an afternoon lunch (approximately one-seventh) and reduce the carbohydrate of the breakfast to about the same amount.

A good source of protein should be included at each meal (milk, eggs, meat, fish, or cheese) The fat is apt to divide itself naturally with fairly even distribution throughout the meals.

SAMPLE MEAL PLANS

The simplified method of calculating a diabetic diet just described is recommended, since it is the procedure most likely to make certain that the diet is adjusted to the food preferences of the individual. "Diet lists" prepared in advance can be used for convenience, provided that they are modified to suit the special needs of the individual. For this reason nine sample meal plans (Tables 28 and 29) were prepared by the committee to fit various needs

Each of these nine diets has been outlined and illustrated with sample menus in small leaflets which may be distributed to patients. It is expected that these will be used in conjunction with the booklet *Meal Planning with Exchange Lists* which has also been prepared for the use of patients In addition, two other leaflets for patients have been prepared in one of which appropriate changes in the exchange lists have been made to fit the need for modifications in sodium content. The other leaflet indicates adaptations of the exchange lists to fit those who may need to use bland-flavored foods.

For the physician, a special leaflet has been prepared, containing

the carbohydrate, protein, fat, and caloric content of each food exchange, tables of prescriptions for various levels of dietary intake, desirable weights for men and women, and notes regarding the selection of diet prescriptions for adults and children.

TABLE 28

CALORIC LEVELS OF SAMPLE MEALS FOR DIABETICS

Meal Plan	Carbohydrate (Gm)	Protein (Gm)	Fat (Gm)	Energy (Calories)
1	125	60	50	1,200
2	150	70	70	1,500
3	180	80	80	1,800
4	220	90	100	2,200
5*	180	80	80	1,800
6*	250	100	130	2,600
7*	370	140	165	3,500
8	250	115	130	2,600
9	300	120	145	3,000

* Planned particularly for children

TABLE 29

SAMPLE MEAL PLANS FOR DIABETICS

Diet	Milk	Veg A	Veg. B	Fruits	Bread Exchange	Meat Exchange	Fat Exchange
1	1 pt.	As desired	1	3	4	5	1
2	1 pt.	As desired	1	3	6	6	4
3	1 pt	As desired	1	3	8	7	5
4	1 pt	As desired	1	4	10	8	8
5*	1 qt	As desired	1	3	6	5	3
6*	1 qt.	As desired	1	4	10	7	11
7*	1 qt	As desired	1	6	17	10	15
8	1 pt	As desired	1	4	12	10	12
9	1 pt.	As desired	1	4	15	10	15

* These diets contain more milk and are especially suitable for children.

The twelve leaflets and the *Meal Planning with Exchange Lists* are available from The American Dietetic Association, 620 North Michigan Avenue, Chicago 11, Illinois

USE OF THE EXCHANGE LISTS

Because the figures for use in calculating diets for the patient with diabetes have been recommended by all three of the co-operating

agencies (16), the material is receiving widespread interest, and increased and more widespread use. The Diabetes Section of the U.S. Public Health Service also has available a series of colored filmstrips with sound recording suitable for use in the group teaching of professional and lay people. The series on nutrition includes a practical presentation of the food exchange lists. These filmstrips have been prepared in co-operation with The American Dietetic Association and the American Diabetes Association.

Nutritional evaluation.—An appraisal of the various nutrient, mineral, and vitamin contents of the diet may be made simply by comparison with the normal dietary plans. As previously stated, an evaluation of the vitamin A and the carotene content of various diets has been made by a committee of the Diet Therapy Section (17). It was found that low-caloric and low-fat diets frequently served to diabetics contained between 91 and 2,600 I.U. of vitamin A when liver was not served once a week. These same diets were high in carotene, however, owing to the large amount of fruits and vegetables present These facts become of importance where there is a dysfunction in the assimilation and metabolism of carotene, as frequently occurs in diabetes and liver damage. In these cases it will be desirable to use liver one or more times per week or to add vitamin A supplements

REFERENCES

1 Calculation of diabetic diets, J Am Dietet A., 24:218–19, 1948
2. McCance, R. A., and Widdowson, E M Chemical composition of foods 2d ed. Brooklyn, N Y : Chemical Publishing Co , 1947
3 Chatfield, C , and Adams, G Proximate composition of American food materials (U S Department of Agriculture Circular No. 549) 1940.
4 Bureau of Human Nutrition and Home Economics in co-operation with the National Research Council Tables of food composition in terms of eleven nutrients ("U S Department of Agriculture Miscellaneous Publications," No 572) 1945
5. Olmsted, W. H The available carbohydrate of fruits and vegetables, Proc. Am. Diabetes A., 9:385–406, 1950
6. Hummel, F. C., Shepherd, M L., and Macy, I G Disappearance of cellulose and hemicellulose from the digestive tracts of children, J Nutrition, 25:59–70, 1943
7. Buchanan, J M , and Hastings, A B The use of isotopically marked carbon in the study of intermediary metabolism, Physiol. Rev., 26:120–55, 1946.
8 Bloch, K. The metabolism of acetic acid in animal tissues, Physiol. Rev , 27:574–620, 1947

9. WOOD, H. G. The fixation of carbon dioxide and the inter-relationships of the tricarboxylic acid cycle, Physiol. Rev., 26:198–246, 1946
10. STADIE, W. C. The intermediary metabolism of fatty acids, Physiol. Rev., 25:395–441, 1945.
11. WILLIAMS, R. D., WICKS, L., BIERMAN, H. R., and OLMSTED, W. H. Carbohydrate values of fruits and vegetables, J. Nutrition, 19:593–604, 1940.
12. BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS. Consumption of food in the United States, 1909–48. ("U.S. Department of Agriculture Miscellaneous Publications," No. 691.) 1949.
13. STERN, F. Applied dietetics. 3d ed. Baltimore· Williams & Wilkins Co, 1949.
14. TURNER, D. Handbook of diet therapy. 1st ed. Chicago: University of Chicago Press, 1946
15. CASO, E. K., and STARE, F. J. Simplified method for calculating diabetic diets, J.A.M.A., 133:169–71, 1947.
16. Revised tables of food values, Proc. Am. Diabetes A., 9:403–6, 1950.
17. JOHNSON, D. Vitamin A versus carotene content of low-fat diets in obesity, cholecystitis, and liver disease, J. Am. Dietet. A., 25:873–74, 1942.
18. BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS. Family food consumption in the United States, spring, 1942. ("U.S. Department of Agriculture Miscellaneous Publications," No. 550) 1944.

Chapter 9 | *The Sodium-restricted Diet*

The sodium-restricted diet is an allowance of food and drink in which the sodium content is restricted to a prescribed level. Other nutrients remain as nearly as possible on a level satisfactory for nutritive efficiency.

The person on an unrestricted diet may consume ordinarily between 5 and 10 gm. or more sodium daily, as a result of sodium products added in commercial processing, in preparation in the kitchen, and at the table. In addition, Bills (2) has pointed out:

> Many manufactured food products which are not intentionally salted contain somewhat more sodium than the natural foods from which they are prepared. The source of this sodium is found in the numerous special uses of sodium compounds in the food industry Sodium chloride is employed for many purposes besides seasoning, preserving, pickling, and koshering As brine it is used (a) in the flotation process of sorting green peas from hardened peas and heavy extraneous matter, (b) for preventing enzymic discoloring of freshly sliced apples and pears which are to be canned, (c) as a heat transfer and blanching agent in freezing foods, and (d) for regenerating base-exchange water softeners (the sodium appears in the softened water as bicarbonate, and water thus treated is used in canning to prevent toughening of vegetables)
>
> Sodium alginate is employed as a stabilizer for ice cream and chocolate milk drinks Sodium aluminum sulphate is the alum of baking powders. Sodium benzoate is used as a preservative in fruit juice concentrates, confectionery, margarine, and so on Sodium bicarbonate is the gas source in baking powders and self-rising flours. It is also used with cocoa in the "Dutching" process, for tenderizing vegetables, and for neutralizing Sodium carbonate is used for Dutching, neutralizing, and water softening. It has a special use in removing hop resins from brewers' yeast in the debittering process. Sodium citrate is used as a stabilizing agent in evaporated milk and jellies Sodium glutamate is an important flavoring adjunct. Sodium hydroxide is used for Dutching cocoa, neutralizing corn syrup, debittering ripe olives, and hulling corn in the old lye

process of hominy manufacture. It is also widely used in peelin peaches, grapefruit segments, carrots, and sweet potatoes, for cannii dipping fruits prior to drying. Sodium acid phosphate is used as an a agent. The secondary phosphate is used for emulsifying process stabilizing evaporated milk, and as the quickening agent in qui *farina*. Sodium acid sulphite is employed for sulphuring fruits prior These few examples may serve to explain the almost ubiquitous occ processed foods of sodium in amounts greater than are present i responding natural products.

Medications and in some cases drinking water may also c important sources of sodium.

NUTRIENT CONTENT

Since the level of sodium prescribed for therapy may va 200 mg. daily to 2,000 mg. or more, depending upon the nee individual patient, it becomes desirable to have a basic which protein, mineral, and vitamin needs may be at a l nutritive sufficiency but from which modifications may be suit the level of sodium prescribed. For this reason, the app plans of normal diet described in the section on normal recommended as the basic pattern of diet. For example patient is an adult, the appropriate basic pattern (Table 2) used for making modifications. If the patient is a pregnant the respective plan of diet (p. 26) should be used. In the ca adolescent or a child, normal patterns of diet (Tables 6 should be used as a basis for the sodium modifications. In p a 500-mg. sodium diet for an adult, for example, the ki amount of the food groups described in Table 30 might be

FOOD PREPARATION

Meat, poultry, and fish may be enhanced in flavor by usi combinations. Cranberry sauce with poultry, applesauce wit mint jelly with lamb, and lemon with fish are standbys. Fo who like meat or fish cooked in tomato sauce, unsalted tomato, juice or purée, may be combined with garlic, onion pepper, and mushrooms and flavored with such herbs as o if desired. Meat and fish may be simmered or baked in this Wines, low-sodium French-type dressings (see salad dressing l lemon, and vinegar provide excellent marination for meat.

TABLE 30

500-Mg Sodium Diet for an Adult

(80 Gm. Protein; 1,545 Calories; Derived from Normal Diet, Table 2)

Daily Food Plan*	Sodium (Mg.)	Protein (Gm.)	Calories
Milk Group†			
1 pt. whole	244	17	330
Meat and Egg Group			
1 egg	70	6	75
4 oz. cooked meat, poultry, or fish (edible portion), no added sodium	104	28	300
Vegetable and Fruit Group			
[illegible]	9	2	30
[illegible]	8	2	50
[illegible] serving)	1	1	40
Other fruit (2 servings)	5	1	80
Bread-Cereal-Potato-Legume Group			
8 servings (no added sodium)	60	21	640
Fats and Sweets			
Without this group, the calories will be approximately 1,545‡			...
Total	501	78	1,545

* For additional values on sodium content of foods see Tables 44, 45, and 46 (pp. 177–83).

† *During pregnancy, adolescence, and childhood,* 1 quart of milk should be used, thus increasing the sodium from milk to 488 mg. The use of skim milk will reduce the calories by approximately half, protein and sodium remain the same.

‡ For substitutions or additions to suit caloric needs see Table 30A. For a sample menu pattern and sample meals see Table 30B.

Modification for 250-mg. sodium diet.—The use of a specially processed low-sodium milk may reduce the sodium content of milk by approximately 90 per cent. A palatable [illegible]

Modification for 1,000-mg. sodium diet.—Substitution of 2 slices *ordinary salted* bread, for the bread to which no sodium has been added, with 2 teaspoons *ordinary salted* butter or margarine will add approximately 500 mg. sodium to the above diet, making the total a 1,000-mg. sodium diet. If omissions, reductions, or changes are made in any other of the food groups, a reassessment of the nutrient content should be made by reference to the values in the normal diet (p. 7).

Modification for 2,000–2,500-mg. sodium diet.—If the *eight servings of the bread group were from ordinary salted bread,* approximately 1,500 mg. sodium would be added [illegible]
ga [illegible]
to [illegible]
meals appear in Tables 30A and 30B.

Daily Food Plan	Description
VEGETABLE AND FRUIT GROUP—*Continued*	
6 servings—*Continued*	One orange or ½ grapefruit or 1 large tangerine or ½ cup citrus juice is considered one serving of citrus fruit. One cup strawberries, or 1 cup red raspberries or ¼ cantaloupe is a satisfactory substitute. Sodium content of fruit is approximately *1 mg.* per serving and 40 calories per serving.
A citrus fruit or other fruit rich in vitamin C daily	
BREAD-CEREAL-POTATO-LEGUME GROUP (no added sodium)	
8 servings	One slice of bread or substitute (no sodium added) contains about 70 calories and *9 mg. sodium* or less; i.e., ½ cup cooked potato, rice, dried beans, cornmeal, noodles, spaghetti, corn, or ¼ cup sweet potato will contain less than *5 mg. sodium.* The cooked cereals, such as farina, rolled oats, rolled wheat cereal, and wheat meals, are low in sodium (avoid "quick-cooking" cereals to which a sodium salt has been added) The prepared cereals to which no sodium has been added are Puffed Rice, Puffed Wheat, and Shredded Wheat. Avoid other prepared cereals with sodium added.
FATS AND SWEETS	*Without this group* the calories in the diet approximate 1,545 If 1 teaspoon sugar, jelly, or honey is included, approximately 20 calories are added. No sodium need be estimated for this. If 1 teaspoon fat or oil is included, approximately 45 calories are added Oils are not ordinarily salted. Bacon, ham fat, salt pork, sausage fat, margarine, and butter will have considerable amounts of sodium Two teaspoons ordinary, salted butter or margarine contain about *100 mg sodium.* Unsalted butter and margarine to which no sodium has been added will be a negligible source of sodium.
SALT SUBSTITUTES	Salt substitutes should be used only upon recommendation of a physician.
IODINE	A source of iodine may become necessary, since iodized salt cannot be used.
WATER	Drinking water may be an important source of sodium (see Table 46, p. 184)

TABLE 30B

500-Mg. Sodium Diet—Menu Pattern and Sample Meals for an Adult

(80 Gm. Protein; 1,545 Calories; Derived from Table 30A)

Daily Food Plan*	Sample Menu Pattern‡	Sample Meals‡
	A.M.	
Milk Group 1 pt Meat and Egg Group 1 egg and 4 oz. (edible portion) meat, poultry, or fish No added sodium	1 citrus fruit or ½ cup juice 1 egg ½ cup low-sodium cooked cereal or ¾ cup flake-type* *1 slice low-sodium, enriched, or* whole-grain bread or toast Spread† Coffee or tea if desired Sugar	Sliced tangerine 1 egg Oatmeal with milk and sugar† *Toast with spread†* Coffee Sugar
	Noon	
Vegetable and Fruit Group 6 servings *A dark-green or deep-yellow* vegetable daily Citrus fruit or other fruit rich in vitamin C daily No added sodium Bread-Cereal-Potato Group 8 servings No added sodium	2 oz. (edible portion) meat, poultry, or fish 3 servings of the bread-potato-cereal group* Fresh or cooked vegetable Fruit 1 glass milk Tea or coffee if desired	Club sandwich: Sliced chicken Sliced tomato Lettuce Spread† Tossed salad with special dressing‡ Fresh mixed fruits Milk
	P.M.	
Fats and Sweets† No added sodium (*Without this group* the diet contains 1,545 calories)	2 oz (edible portion) meat, poultry, or fish 2 servings from potato-bread-cereal group* Dark-green or deep-yellow vegetable Other vegetable Fruit 1 portion from bread group* Milk	Roast pork Sweet potato Frozen green beans Chinese cabbage with special dressing§ Spiced peaches† Hot roll (no added sodium) Spread† Milk

* See Table 30A for alternates or substitutes in each food group

[illegible] teaspoon [illegible] alories [illegible] ents.

‡ For discussion of food preparation see pp 56–61

§ For French-type salad dressing with no added sodium see p 95.

Some additional flavor combinations are as follows:

Beef—dry mustard, marjoram, nutmeg, onion, sage, thyme, pep grape jelly
Lamb—mint, garlic, rosemary, curry, broiled pineapple rings
Veal—bay leaf, ginger, marjoram, curry, currant jelly, spiced apric
Chicken—paprika, mushroom, thyme, sage, parsley, cranberry sau
Fish—dry mustard, paprika, curry, bay leaf, lemon juice, mush sherry
Eggs—pepper, green pepper, mushrooms, dry mustard, paprika, c or pineapple omelet

Vegetables may be flavored with a sweet-sour sauce (dilute gar and sugar, seasoned with grated onion, spices, and h desired) or with hot low-sodium salad dressing made as f canned tomato, tomato juice, or purée (no sodium added) m flavored with lemon or vinegar, sugar, grated horse-radish onion, garlic, spices, and herbs as desired. Calories will be negli Other possible flavor combinations are as follows:

Asparagus—lemon juice
Beans, green—marjoram, lemon juice, nutmeg, dill seed
Broccoli—lemon juice
Cabbage—mustard dressing, dill seed, unsalted butter with lemon and sug
Cauliflower—nutmeg
Corn—green pepper, tomatoes
Peas—mint, mushroom, parsley, onion
Potatoes—parsley, unsalted butter, mace, chopped green pepper, chives, onio
Squash—ginger, mace
Sweet potatoes—candied or glazed with cinnamon or nutmeg or escalloped wit apples
Tomatoes—basil, oregano

Vegetable aspics may be concocted with plain gelatin, tomato juice (no sodium added), and lemon, grated cabbage, cucumber, and green pepper Low-sodium dressing or mayonnaise with no added sodium may be used. Vegetables canned without added sodium are available. Frozen lima beans or peas may have sodium added. Labels should be carefully read, and information sought from commercial firms.

Baked goods pose a special problem because the ordinary products contain not only salt but soda and baking powder, which are also high in sodium Low-sodium products may be prepared, however, from combinations of foods permitted on the diet Unsalted fats and oils are available. Leavening may be obtained from yeasts or sodium-

free baking powder. The following formula may be prepared by a pharmacist:

Potassium bicarbonate—39.8 gm.
Cornstarch—28.0 gm.
Tartaric acid—7.5 gm.
Potassium bitartrate—56.1 gm.

Low-sodium bread is usually available from bakeries in the larger cities. If not, it must be made at home. Special crackers, cookies, and cake are sold. In all cases it is important to read the labels for the number of milligrams of sodium contained.

Low-sodium milk is available. In many parts of the country a palatable product has been obtained by passing fluid milk through an ion-exchange resin at 35°–40° F. The result is the replacement of sodium with an equivalent amount of potassium. The taste and flavor of the milk are only slightly affected. However, this product contains only about 50 per cent of the thiamine, niacin, and vitamin B_{12} of the original milk and about 75 per cent of the calcium and vitamin B_6. The potassium is doubled but is still within the normal physiologic intake for adults of 3–5 gm. The Council on Foods and Nutrition of the American Medical Association (3) recommends the following levels per quart:

Sodium, less than	50	mg.
Potassium, less than	2.5	mg.
Thiamine, at least	0.15	mg.
Riboflavin, at least	1.0	mg.
Niacin, at least	0.4	mg.
Vitamin B_6, at least	300	μg.
Vitamin B_{12}, at least	3	μg.

Dried, low-sodium milk products are also available.

SUPPLEMENTARY MATERIALS

Numerous special cookbooks have been prepared for patients on low-sodium diets. However, the value of any recipe depends upon an accurate estimate of the sodium content per serving and the proper substitution within each individual diet. This usually requires guidance from a dietitian, nutritionist, or physician. A critical review of low-sodium cookbooks, booklets, and materials on meal planning has been prepared at the request of the Nutrition Com-

mittee, American Heart Association, and published in the *Journal* of The American Dietetic Association (1957) (5).

More recently, three booklets (4) for patients have been prepared by a Subcommittee on Sodium Restricted Diets, American Heart Association. Reasons understandable to the lay person are given as to the "Whys and Wherefores of a Sodium Restricted Diet"; descriptions of diet plans limited in sodium and calories are presented; and questions regarding food preparation are answered. The Nutrition Committee of the American Heart Association has limited the plans to 500-mg., 1,000-mg , and 2,400–2,500-mg. sodium diets, since it was felt that prescriptions between these levels are unnecessary for therapeutic purposes. These three booklets are available from the American Heart Association, 44 East Twenty-third Street, New York 10, New York, to physicians, dietitians, nutritionists, and nurses.

For professional persons, the publication entitled *Sodium Restricted Diets: The Rationale, Complications, and Practical Aspects of Their Use* ("Food and Nutrition Board–National Research Council Publications," No. 325 [1954]) provides an excellent reference on the normal physiology of sodium metabolism, the use of sodium-restricted diets in congestive cardiac failure, hypertension, renal disease, cirrhosis of the liver, toxemias of pregnancy, Ménière's disease, and hormone therapy, as well as contraindications for the use of low-sodium diets and salt substitutes. Of particular value to nutritionists and dietitians is the extensive compilation of the sodium and potassium content of foods and the sodium content of public water supplies, arranged by states. A short table entitled "Estimated Best Values" has been reproduced from this publication and appears in Appendix VII as Table 44. Additional tables on the sodium content of foods by Bills *et al.* (2) and by Peterson, Skinner, and Strong (1) appear in Appendix VII, in Tables 45 and 46 (pp. 179–86). Since sodium is closely related to other extra- and intracellular ions, particularly potassium, a guide to the potassium content of foods has also been included in Tables 45 and 46.

REFERENCES

1. PETERSON, W. H., SKINNER, J. T., and STRONG, F. M. Elements of food biochemistry, pp. 262–65. New York: Prentice-Hall, Inc., 1953.

2. BILLS, C. E., McDONALD, F. G., NIEDERMEIER, W., and SCHWARTZ, M. C. Sodium and potassium in foods and water, J. Am. Dietet. A., 25:304-14, 1949.
3. COUNCIL ON FOODS AND NUTRITION. Low sodium milk, J.A.M.A., 163:739, 1957.
4. HEAP, B., and ROBINSON, C. New diet booklets for cardiac patients and sodium restriction, J. Am. Dietet. A., 34:277-79, 1958.
5. REIMER, A., JOHNSON, D., and ROBINSON, C. Sodium restricted diets, J. Am. Dietet. A., 33:104-7, 1957.

Chapter 10 | *The Low-Purine Diet*

The low-purine diet is a food allowance in which sources of purines, such as glandular organs, dried legumes and lentils, and meat extractives, are eliminated, and other meat and fish are restricted to 4 oz weekly, thus reducing the daily intake of uric acid, equivalent to approximately 35 mg. If a high-carbohydrate, low-fat regimen is imposed in addition, as has been suggested by Bartels (1), further modifications may be made, as outlined in the discussion of the low-fat diet (p. 56).

The following discussion of the purine content of foods and the outline for the low-purine diet is taken from a report of a committee of the Diet Therapy Section of The American Dietetic Association (2):

> A review of the available literature regarding the purine content . . . of foods revealed a distressing paucity of usable figures and consistent values. The committee felt itself incompetent to evaluate the data inasmuch as the sources used and methods of analyses could not be satisfactorily compared.
>
> In an attempt to obtain the most recent figures available, aid was solicited from outstanding authorities throughout the United States It was found that none were using purine calculations or could add to the common list of references, or would attempt to evaluate comparatively the tables given in current texts

An outline has been prepared by this committee as a guide for practical use in planning a low-purine diet. When protein-rich foods have been omitted because of their relatively high purine content, increases have been made in milk, eggs, and cheese to maintain normal protein levels.

BREAKFAST

Fruit—citrus fruit or tomato juice
Cereal (except oatmeal), with cream or milk and sugar
Eggs—2
Toast (whole-grain or enriched white), with butter or enriched margarine. Jelly, jam, honey, or marmalade if desired
Beverages—decaffeinated coffee or cereal coffee with cream and sugar

LUNCH AND DINNER

Soup—milk soups made with any vegetables except those forbidden (see special instructions below)
Meat, fish, or fowl—only 2-oz. portion twice weekly, omitting glandular meats entirely; 2-oz. portion of cheese daily on days meat is not served
Vegetables—potato daily if desired; 2–4 additional vegetables (any except those on forbidden list)
Bread—whole-grain or enriched, with butter or enriched margarine
Dessert—fruit, puddings, cake, ice cream, gelatin desserts, or pie
Beverage—milk or buttermilk and decaffeinated coffee or cereal coffee

SPECIAL INSTRUCTIONS

1. Avoid liver, sweetbreads, brains, and kidney. A 2-oz. portion of any other meat, fish, or fowl may be served twice weekly.
2. Serve cheese and eggs as meat substitutes. Fish roe and caviar may be used as desired.
3. Use 1–2 pt. of milk daily in order to meet the protein need.
4. Omit all meat extracts, broth soups, and gravies.
5. Eliminate the following vegetables entirely from the diet: dried beans, lentils, dried peas, spinach.
6. Avoid coffee, tea, chocolate, and cocoa. Use decaffeinated coffee or a cereal coffee if desired. (There is some question as to whether or not caffeine can be converted into uric acid in the body.)
7. Omit alcoholic beverages of all kinds.
8. Allow fruits of all kinds—fresh, canned, and dried.
9. Allow cereals of all kinds except oatmeal.
10. Serve sugar as desired with amounts adjusted to caloric needs. Cream and butter may be restricted when a low-caloric allowance is needed or when a low-fat regimen is desired.

TABLE 31

PURINE CONTENT OF FOODS PER 100 GM.

Group I (0–15 Mg.)	Group II (50–150 Mg.)	Group III (150–800 Mg.)
Vegetables	Meats	Sweetbreads
Fruits	Fish	Anchovies
Milk	Sea food	Sardines
Cheese	Beans, dry	Liver
Eggs	Peas, dry	Kidney
Cereals	Lentils	Meat extracts
	Spinach	

TABLE 32

EVALUATION OF A LOW-PURINE DIET

DAILY FOOD INTAKE	QUANTITY		MINERALS		VITAMINS					FOODSTUFFS			CALORIES*
	Weight (Gm)	Approximate Measure	Ca (Gm)	Fe (Mg)	A (I U)	Ascorbic Acid (Mg)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Equivalent (Mg)	Carbohydrate (Gm)	Protein (Gm)	Fat (Gm)	
Milk, whole†	976	1 qt	1.16	0.8	1,560	10	0.36	1.68	9.2	48	34	38	660
Eggs	108	2 medium	0.06	2.6	1,100		0.10	0.28	3.5	Trace	12	12	150
Cheese, Cheddar-type	75	2½ oz	0.54	0.8	1,050		0.02	0.31	3.9	2	19	24	300
Bread, whole grain or enriched white	150	5 slices	0.13	3.0			0.40	0.24	5.6	75	13	5	400
Cereal, whole grain or enriched	20	¾ cup	0.03	0.6		.	0.08	0.04	0.8	15	3	1	80
Potato, cooked	150	1 medium	0.02	1.1	30	21	0.14	0.05	1.3	29	3	.....	130
Vegetable, green or yellow‡	100	½ cup	0.09	1.3	6,280	30§	0.08	0.15	1.3	5	2	......	30
Vegetable, other‖	100	½ cup	0.03	0.5	225	15§	0.05	0.05	0.5	5	1	....	25
Fruit, citrus	100	1 serving♯	0.02	0.2	110	45	0.05	0.02	0.2	10	1	.....	40
Fruit, other		1 serving♯	0.02	0.5	955	18	0.04	0.05	0.5	10	1	.....	40
Sugar, jelly, or honey	20		. .	0.1	...	1	.....	...	.....	16	.....	.....	60
Butter or fortified margarine . .	20	4 level teaspoons	..	.	660	.....	.	.....	....	....	.....	16	145
Total**. .	..		2.10	11.5	11,970	140	1.32	2.87	26.8	215	89	96	2,060**

* Calories have been rounded off to nearest 5.

† Milk equivalents may be noted in Table 10

‡ Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, turnip greens, and other greens

§ For canned vegetables, reduce by one half.

‖ Tomato—fresh, canned, or juice, vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage; and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower.

♯ Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values as in Table 24

** Minerals, vitamins, and protein will approximate the Recommended Dietary Allowances (see Table 3) for the normal adult. To meet additional caloric needs, further amounts of the above foods may be used, plus other sugars, starches, and fats (Tables 35 and 36).

The approximate content of the above diet is 11 mg. of purine nitrogen or 34 mg. of uric acid. The normal diet plan as outlined in Table 2 contains approximately 132 mg. of purine nitrogen or 265 mg. of uric acid.

Table 31, adapted from Stare and Thorn (3), gives a rough approximation of the purine content of foods. Table 32 contains an enumeration and evaluation of the mineral, vitamin, carbohydrate, protein, and fat content of a low-purine diet. Modifications may be made to meet the needs of individual patients by making adjustments in any of the components of the diet.

REFERENCES

1. Bartels, E. C. Successful treatment of gout, Ann. Int. Med., 18:21–28, 1943.
2. Duckles, D. Purine and cholesterol content of foods, J. Am. Dietet. A., 15:772–74, 1939.
3. Stare, F. J., and Thorn, G. W. Protein nutrition in problems of medical interest, J.A.M.A., 127:1120–27, 1945.

Chapter 11 | Miscellaneous Modifications

KETOGENIC DIETS

A ketogenic diet is one in which the proportion of carbohydrate, protein, and fat is regulated so that the ratio of the ketogenic to the antiketogenic values equals 2 or more or until it is sufficiently high to produce a ketosis (see Glossary).

Ketogenesis —The production of the "ketone bodies," i.e., acetone, aceto-acetic acid, and beta-oxybutyric acid, is known as "ketogenesis." The precursors of the ketone bodies are the fatty acids and certain of the amino acids, e.g., phenylalanine, tyrosine, leucine, and histidine, these are known as "ketogenic substances." For clinical purposes the ketogenic portion of the diet may be estimated as 90 per cent of the weight of the fat and 50 per cent of the protein.

Antiketogenesis —Carbohydrate and the amino acids, such as alanine and glycine, which are convertible to glucose in the body, tend to prevent the accumulation of ketone bodies and are said to be "antiketogenic." Approximately 10 per cent of the weight of the fat in the diet, 50 per cent of the protein, and 100 per cent of the carbohydrate may be estimated as the antiketogenic portion.

When the supply of carbohydrate is inadequate, ketogenesis becomes predominant.

Plan of daily food intake.—If the basic plan of normal diet contains carbohydrate, 150 gm ; protein, 70 gm.; and fat, 70 gm., the ketogenic to antiketogenic ratio is 1 : 2. In order to reverse this ratio and produce a ketosis, it is necessary to reduce the carbohydrate and change the proportions approximately to carbohydrate, 20 gm.;

having a total cation-forming ash content which is equivalent to 20 cc. or more of tenth-normal alkali in excess of the total anion-forming ash, which will be equivalent to 25 cc. or less of tenth-normal acid; proteins, minerals, and vitamins remain at levels necessary for nutritive efficiency.

In general, it can be said that vegetables and fruits are predominantly basic, while cereals, meats, poultry, and fish are predominantly acidic in residue. Most fruits, in spite of their acidity, exert a basic effect on the body, since a number of organic acid radicals, such as citrate and malate, may be oxidized completely to carbon dioxide and water, leaving the salts to contribute to the supply of basic elements in the residue. A few organic acids, however, are not so oxidized, such as benzoic and quinic acids, and hence contribute to the total acidity. Cranberries, plums, and prunes are examples of such fruits. However, exceptions have been found in certain varieties of prunes and plums (1). Foods which exert no acidic or basic effect are refined sugar, butter, lard, oil, cornstarch, and tapioca. Molasses is strongly basic in residue, with an excess of 59.4 cc. of tenth-normal base per 190 gm. Information relating to the excess acid and base values may be found in Table 47, taken from Bridges and Mattice (2).

REFERENCES

1. TURNER, D., and PARSONS, H. Not all plums and prunes acid-forming when used in human diet. *In:* Annual report of the director, 1930–31, p. 121. Madison: Agricultural Experiment Station, University of Wisconsin, 1932. (Bull. 421.)
2. MATTICE, M. R. Bridges' food and beverage analyses, pp. 201–32. 3d ed. rev. Philadelphia: Lea & Febiger, 1950.

SECTION III | INTERVIEWING THE PATIENT

Interviewing the Patient[1]

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The modern trend in therapy is to consider the patient as a whole personality in a social setting[2] and to regard as significant and important every therapeutic contact with the physician, with medical or family caseworker, and with the dietitian. It is realized that, to obtain the best results, specialists must, in addition to performing their special tasks, co-operate in a common therapeutic task—the work and skill of one complementing that of the others. The increased emphasis upon the importance of the patient's whole personality makes new demands upon the dietitian as increased knowledge shows the many ways in which specific food behavior, as well as disease pictures requiring special diets, are themselves concomitants of deep-seated personality distortions and overemphasis.[3]

1. This discussion draws upon materials contributed by the large group of members of The American Dietetic Association who co-operated in the project of the Diet Therapy Section on Food and Emotions during 1942–44, which was undertaken in co-operation with the Committee on Food Habits, National Research Council, and the case histories were analyzed by Dr Margaret Mead, executive secretary of that committee Received for publication, February 5, 1945 From *Journal of The American Dietetic Association*, Vol 21, No. 7, July–August, 1945

2. H B Richardson, *Patients Have Families* (New York. Commonwealth Fund, 1944); also G C. Robinson, *The Patient as a Person* (New York: Commonwealth Fund, 1939)

3 F. Alexander, The influence of psychologic factors upon gastro-intestinal disturbances a symposium· a report upon research carried on at the University of Chicago Institute for Psychoanalysis I General principles, objectives, and preliminary results. Summarized in Psychosom Med, 1:429, 1939 See also the following· H. Bruch, *Ad-*

Just as at an earlier period in the development of dietetic practi the dietitian learned to understand the extent to which aspects o the patient's behavior in the dietetic interview might be referred t a need for attention, to a desire to show off, or to the gratification o long-denied needs for a relationship with another human being who appeared to take an interest in one's health and fate, now there is a need to integrate into dietetic practice the new findings based upon the work of psychiatrists exploring the new field of psychosomatic medicine. If this integration is to keep pace with the growing discoveries in this field, it must take place not only in the professional schools as new students enter dietetics and in the training for internships of recent graduates but also in the established practice within the hospital and food clinic. In the professional schools young dietitians can profit by instruction from psychiatrists; in the operating clinical situation the new methods can spread best by self-aware teamwork in which the dietitian re-evaluates her current procedures in the light of increasing knowledge of the patient's whole personality and takes it upon herself to communicate to her colleagues—the physician, the psychiatrist, the medical caseworker, and the nurse—just what the possibilities of a dietetic interview are in terms of an all-round therapy designed to meet the needs of the patient as a whole personality who emerges from the hospital to live in a real social situation.

One of the ways in which this increased awareness on the part of the dietitian may be developed is by a consideration of the different roles in which the dietitian sees herself, in which the patient sees her, and in which her professional colleagues in related professions see her. The role of the dietitian is subject to great variation in scope, from that of someone who merely works out a list of foods based

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justment to Dietary Changes in Various Somatic Disorders, in the Problem of Changing Food Habits (Committee on Food Habits, National Research Council Bull. 108 [Washington, 1943]), p. 66; H. Bruch and G. Touraine, Obesity in childhood. V. The family frame of obese children, Psychosom Med , 2:141–206, 1940; H. Bruch, Food and emotional security, in *The Nervous Child*, 3:165. Also M Mead, Dietary patterns and food habits, J. Am Dietet. A , 19:1, 1943, L. Rahman, H B. Richardson, and H S. Ripley, Anorexia nervosa with psychiatric observations, Psychosom. Med , 1:335, 1939, J V. Waller, R M. Kaufman, and F. Deutsch, Anorexia nervosa, a psychosomatic entity, Psychosom Med , Vol 2, No. 1, 1940; B. Mittelmann, H. G. Wolff, and M. P. Scharf, Emotions and gastroduodenal function experimental studies on patients with gastritis, duodenitis, and peptic ulcer, Psychosom. Med., 4:5–61, 1942.

upon a physician's prescription and the age and body weight and degree of activity of the patient, through to the concepts of the worker in a food clinic (*a*) as a specialist who can *translate* for the patient-client a *regime* prescribed by the physician into exact amounts and kinds of foods prepared in specific ways; (*b*) as a specialist in the relationship between food and bodily needs who can *guide* the patient-client in making a selection of foods which will produce changes or maintain a given bodily state; (*c*) as a specialist in all the *problems of adjustment* which an individual faces in one facet of his or her existence—the consumption of food, including budgetary problems, conditions of preparation, etc.; and (*d*) as a *member of a team* of therapists—including the physician, psychiatrist, caseworker, public health nurse—in which case the specific type of help and instruction which the dietitian gives must be keyed to the treatment being given by the whole team and oriented not only to the physical needs of the patient-client but to his whole personality.

Each of these roles, or any combination of them, has to be clear to the dietitian and to the patient; and, if the referral from physician or caseworker has not indicated to the patient what role the dietitian plays, it is necessary for her to indicate it herself. This can usually be done best if the dietitian takes a minute to discover what the patient has been led to expect and then elaborates upon and corrects that impression But a clear definition of why the dietitian is there, what the referring specialist has asked her to do, and what the patient may and may not expect is very important if the dietetic interview is to have its fullest usefulness Roles *a* and *b* are discussed in the preceding sections. This present section is concerned primarily with roles *c* and *d*.

As growing interest and research amplify the scope of the dietitian's work and bring into it an increasing knowledge of social conditions, of personality dynamics, and of the process of therapy as an interpersonal relationship, it is important that these new emphases should not obscure the dietitian's distinctive role as a specialist in the adjustment between bodily needs and eating habits. It is important that she should include in the interview as many as possible of the insights and procedures which make for a good interview, whether conducted by physician, caseworker, or any other specialist in human relations. But it is also necessary that she do definite and con-

crete teaching about foods, the nature *of the particular diet, how i* may be calculated, and how the recommended amounts and propor tions may be obtained within the framework of the patient's habi patterns. While it is true that, in the past, physicians and casework ers have underestimated the general therapeutic implications of th dietetic interview and regarded the dietitian as an automatic sourc of information upon which the patient would inevitably act, it woul easily be possible to err in the other direction and demand so mucl caseworking skill from the dietitian that her necessary and distinc tive teaching function would be obscured.

This distinctive character of the dietetic interview imposes definite limitations upon its form. The dietitian must teach concrete, precise material. She must, whenever possible, also convey to the patient some sense of the principles upon which her concrete teaching is based, and in practically every instance she has to persuade the patient to do something which is painful, that is, to attend, from a new point of view, to the details of diet. This is painful because in our society the conscious application of thought—especially of measuring, counting, calculating, estimating—to an aspect of life which is ordinarily associated with gratification of the senses is regarded as reducing pleasure. Reduction in pleasure *is likely to be resisted,* except by those patients whose peculiar character formation makes them enjoy deprivation, and such patients will present other problems equally difficult to the therapist. However, attempts to make the following of a diet meaningful can be highly successful. The dietitian may expect the patient to feel that her advice is definitely useful if she makes the diet prescription intelligible and easier to follow, makes the goal of loss or gain in weight or a very altered pattern of intake possible of attainment, and makes the diet *itself* reasonably related to the patient's own bodily state and not an arbitrary set of rules. But the dietitian *cannot* expect to make the following of a diet a pleasure-giving experience, and efforts to clothe the interview in such terms are likely to be disappointing. Many instances have been reported where the patient has developed a tie to the dietitian and improved in health and functioning because *someone* was taking an interest in him, but this usually means that the dietitian has had to overstep her role and engage in casework for which she may not

have been specially trained and at the expense of giving other patients specific dietary help.

The dietetic interview remains an interview between a specialist-in-food-adjustments and a patient-who-needs-to-learn-something-about-his-diet, and all improvements in procedure must necessarily take this core into account.

EXTENSION OF THE DIETITIAN'S SKILL IN HELPING THE PATIENT ADJUST HIS FOOD HABITS

Recognition of the importance of treating the patient as a whole personality, with a specific cultural background and real life-situation, leads to the inclusion in the dietetic interview of an attempt to get some understanding of the patient's personality, what his reaction is to the diagnosis which has brought him there, what motives may be invoked in teaching new food patterns, and what special resistances have to be overcome. This preliminary exploration of the patient's personality can take place within the framework of the dietetic interview itself and need not wander to wider topics. The more knowledge the dietitian has of the human personality, the better. She needs to be aware of such special problems of childhood as the conflict between dependence upon the mother and the need to be independent, which is likely to express itself strongly in the field of eating, or of the adolescent desire to be like other young people, as illustrated in the following:

EXTRACT FROM AN INTERVIEW WITH A THIRTEEN-YEAR-OLD DIABETIC GIRL

Patient had come in crying, after a two-month absence, and her tests showed sugar.

DIETITIAN. Why K, what seems to be the trouble? You've always had such a nice smile.

PATIENT: Oh, I've been hungry since school started and have eaten more than I should have—even candy sometimes. I just can't help it when all the others can have everything I *hate* school

D: What would you like to have to eat? We should be able to get together on this and plan your meals the way you want them

P: Oh, *could* you? I'd love to have more bread, dessert once in a while, a little gum and candy

D Have you ever tried D-Zerta or candy or gum sweetened with saccharin? D-Zerta is a gelatin dessert and can be used in many ways, such as with whipped cream or with fruit. [*D. conferred with doctor*] If you like, we might increase the

amount of insulin and your food allowance to include another slice of bread and a couple of pieces of candy.

P: Why, that will make my meals practically the same as all the other girls! That's swell!

The patient came in once a month from then on. She was happy, felt well, liked school, and tests were good.

The foregoing illustrates the methods of a dietitian who responded sensitively to the evidences of distress and placed them in context against the patient's previous behavior. She estimated carefully the importance—to an adolescent—of behaving like the other girls and so evaluated correctly the phrase, "I *hate* school," treated the dietary prescriptions as flexible and capable of adjustment to a genuine need on the part of the patient, and succeeded in establishing the patient in an adequate adjustment.

Each age, each sex, has its special problems. For old age it is important to realize that the patient needs to be treated with the respect due to age and experience of life, yet protected, by written advice for instance, from a growing forgetfulness. Thus increased understanding of different regularities of this sort provides a background for a better understanding of personality.

Knowledge of the patient's cultural background—whether from a rural American home; from a foreign-born family's home; from a minority group, which almost inevitably means poor housing and limited household equipment; from a home where religious usages are observed; or from a type of home where no traditional practices may be relied upon, as when mountain people of the South are transplanted to a northern or western area where all the ways of living are unfamiliar—helps the dietitian to make her teaching realistic and relevant. The more she knows of these differences in dietary practice from one socioeconomic group to another and from one nationality background to another, the surer will be her understanding of the patient's questions or probable confusions, misunderstandings, or embarrassments.

A skilled dietitian will also take into account the patient's social situation in terms of status, occupation, income, and living arrangements—making specific allowance for the difficulties of the patient who lives in a cheap club for girls, the bus driver, or the elevator operator; the domestic servant, who is likely to nibble; the underprivileged mother of young children, who is likely to skimp her own

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TIC TEAM

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Referral to the dietitian.—At present, referral to the dietitian comes usually from the physician if the need is a medical one and from the caseworker if it is a matter of home management. The physician tends to limit himself to such phrases as "reducing diet," "low-fat diet," "high-caloric diet," "high-vitamin diet," "bland diet," and to omit any information on the patient's personality, capacity to

4 Background materials for the inclusion in dietetic practice of cultural and socio-economic factors may be found among the materials developed at the Boston Dispensary Food Clinic by Frances Stern, at the Community Service Society, New York, by Lucy Gillett, and materials currently issued by the Massachusetts Department of Health and the Committee on Food Habits, National Research Council.

follow directions, the role that the patient's illness plays in the patient's life, etc. Upon the hospital dietitian devolves the task of developing such a working relationship with the physician that, instead of saying, "Stop in and see Miss Jones, the dietitian, and she'll give you your diet," the physician will realize the importance of an interpretative referral and say: "Now Miss X, you will need some help in planning the diet which I have prescribed for you. You'll find that Miss Y, our dietitian who specializes in helping people adjust their meals to their particular health needs, will help you work out the details." With increasingly good working relationships between other therapists and the dietitian, the physician and the caseworker also come to appreciate the importance of giving the dietitian clues about the personality of the patient, namely, summaries of what otherwise would often demand many hours of contact with the patient and experience with the way he responds to different types of suggestions; warnings about ways in which the patient will try to use a relationship; and diagnosis of the role that eating plays in the patient's life—as the only available form of sense gratification, as a reaction to mood, as a method of punishing other people or the self, etc. The interested dietitian can accustom physicians to including such suggestions in their referrals. Thus the dietetic interview will get off to a quick start, the patient will be better oriented in what to expect, and the dietitian already alert to some of the patient's most conspicuous characteristics.

The dietetic interview.—The extent to which the dietetic interview itself becomes an integral part of the treatment of a patient who, in addition to being cured of a specific disease condition or taught to keep the disease under control, is also being adjusted as a whole to a life-situation, depends not only on the dietitian's knowledge of personality but on the knowledge of other members of the therapeutic team concerning the character of dietetic interviews in that particular dietetic department of their own hospital or clinic. Too often physicians, caseworkers, and nurses include in their planning for patients their picture of a dietetic interview, experienced or witnessed twenty years ago, in quite another setting. They may actually seek to prepare the patient for, or seek to adjust subsequent treatment to, a dietetic interview very different from that which the patient actually experiences. This ever present danger can be guarded

against by the dietitian's assuming responsibility for seeing that the other members of the therapeutic team actually know what her practice and that of her staff are, what types of alternatives are recognized in adjusting different kinds of patients to the same general dietary prescription, how much detailed instruction is actually involved, and what sorts of aids, written schedules, models, scales, slides, charts, etc., she uses. Adequate exposure of physicians and caseworkers to the procedure of a dietetic department will result in their raising questions about the possibilities inherent in the situation, which in turn will assist the dietitian in orienting her practice to their premises and deepen her knowledge of the emotional factors with which she has to deal.

Referral from the dietitian and case reports.—As the dietitian works more in a team, the other members of which know what her special skills actually are, both she and they will recognize ways in which material gleaned in the dietetic interview may be used as an indicator of the patient's problems or progress. A series of dietetic interviews is sometimes an excellent device for maintaining contact with a patient, especially if the dietitian is alert to signs of improvement or deterioration, of indications of developing conditions—as when a problem which at first looked like simple malnutrition begins to show signs of anorexia nervosa. Attempts to fit the dietetic interview into an integrated pattern of treatment are an excellent device for focusing more attention upon the whole personality of the patient, thereby making the treatment more effective

REFERENCES

1. ALDRICH, C. K. Prescribing a diet is not enough, J. Am. Dietet. A, 33: 785–87, 1957.
2. BABCOCK, CHARLOTTE G Psychologically significant factors in the nutrition interview, J. Am Dietet A, 23:8–12, 1947
3. —— Food and its emotional significance, *ibid*, 24:390–93, 1948.
4. —— Problems in sustaining the nutritional care of the patient, *ibid.*, 28:222–27, 1952.
5. ——. Comments on human interrelations, *ibid*, 33:871–79, 1957.
6. BAYLES, S, and EBAUGH, F G Emotional factors in eating and obesity, J. Am. Dietet. A, 26:430–34, 1950.
7. BERGEVIN, P. Telling vs. teaching—learning by participation, J. Am. Dietet. A., 33:781–84, 1957
8. BRENER, R. Dietitian and patient evaluation of an interpersonal relationship, J. Am. Dietet A, 28:515–19, 1952

9. Bruch, Hilde. The importance of overweight. New York: W. W. Norton & Co., Inc., 1957.
10. Cowing, A. G. Readable writing, J. Am. Dietet. A., 23:1036–40, 1947.
11. ———. Writing that sells good diet, *ibid.*, 24:592–94, 1948.
12. Donahue, W. T. Psychologic aspects of feeding the aged, J. Am. Dietet. A., 27:461–66, 1951.
13. English, O. Spurgeon. Psychosomatic medicine and dietetics, J. Am. Dietet. A., 27:721–25, 1951.
14. Eppright, E. S. Factors influencing food acceptance, J. Am. Dietet. A., 23:579–87, 1947.
15. Flesch, R. The art of plain talk. New York: Harper & Bros., 1946.
16. ———. The art of readable writing. New York: Harper & Bros., 1949.
17. Galdston, Iago. Motivation in health education, J. Am. Dietet. A., 25: 745–51, 1949.
18. ———. Nutrition from the psychiatric viewpoint, *ibid.*, 28:405–9, 1952.
19. Garrett, Annette. Interviewing: its principles and methods. New York: Family Service Association of America, 1950.
20. Gebhard, B. Exhibit planning and analysis, J. Am. Dietet. A., 24:394–98, 1948.
21. Hall, Dorothy. The dietetic interview as a tool in changing food habits, J. Am. Dietet. A., 22:999–1002, 1946.
22. Hamburger, W. W. The psychology of weight reduction: the initial nutritional interview; the nutritionist-patient relationship; and complications of weight reduction, J. Am. Dietet. A., 34:17–22, 1958.
23. Houle, C. O. The dietitian as a teacher of adults, J. Am. Dietet. A., 24: 837–40, 1948.
24. Hymes, J. L. Significance of feeding from the viewpoint of child development, J. Am. Dietet. A., 25:611–12, 1949.
25. Ilg, F. L. The child's idea of what and how to eat, J. Am. Dietet. A., 24: 658–60, 1948.
26. Kreitlow, B. W. Teaching adults democratically, J. Am. Dietet. A., 33: 788–92, 1957.
27. Leach, J. M. Motivating people to use educational material, J. Am. Dietet. A., 29:245–47, 1953.
28. Mead, Margaret. Cultural patterning of nutritionally relevant behavior, J. Am. Dietet. A., 25:677–80, 1949.
29. Miller, C. D. Food and food habits in the Hawaiian Islands, J. Am. Dietet. A., 27:461–66, 1951.
30. Mitchell, Helen S., and Joffe, Natalie F. Food patterns of some European countries: background for study programs and guidance of relief workers, J. Am. Dietet. A., 24:676–87, 1944.
31. Posz, A. C Do you irritate others when you listen? J. Am. Dietet. A., 34: 730–32, 1958.
32. Pragoff, Hale. Areas of cooperation between medical social workers and dietitians, J. Am. Dietet. A., 24:485–90, 1948.
33. Rabinovitch, R. D., and Fischhoff, J. Feeding in childhood to meet emotional needs: a survey of the psychologic implications of eating, J. Am. Dietet. A., 28:614–21, 1952.
4. Radke, Marian, and Ca… …periments … food habits, J. Am. Dietet. A., 23 …

35. ———. Lecture and discussion—decision as method of influencing food habits, *ibid.*, 24:23–31, 1948.
36. SPENCER, M. E. An educator talks about motivating people, J. Am. Dietet. A, 25:209–12, 1949.
37. TOWLE, C. Common human needs. ("Public Assistance Reports," No. 8) Washington: Federal Security Agency, 1945.
38. TRULSON, M., WALSH, E. D., and CASO, E. K. A study of obese patients in a nutrition clinic, J. Am. Dietet. A., 23:941–46, 1947.
39 WALSH, ETHEL. Nutritionists and social workers cooperate on mutual problems, J. Am. Dietet. A., 25:681–83, 1949.
40. WHITE, G. The patient as the focus of attention, J. Am. Dietet. A, 30:25–28, 1954.
41. DEPARTMENT OF PEDIATRICS, UNIVERSITY OF CHICAGO Liberal infant feeding, J. Am. Dietet. A., 22:622–24, 1946.
42. Motivation in health education. (The 1947 Health Education Conference of the New York Academy of Medicine) New York: Columbia University Press, 1948.

9. BRUCH, HILDE. The importance of overweight. New York: W. W. Norton & Co., Inc., 1957.
10. COWING, A. G. Readable writing, J. Am. Dietet. A., 23:1036–40, 1947.
11. ———. Writing that sells good diet, *ibid.*, 24:592–94, 1948.
12. DONAHUE, W. T. Psychologic aspects of feeding the aged, J. Am. Dietet. A., 27:461–66, 1951.
13. ENGLISH, O. SPURGEON. Psychosomatic medicine and dietetics, J. Am. Dietet. A., 27:721–25, 1951.
14. EPPRIGHT, E. S. Factors influencing food acceptance, J. Am. Dietet. A., 23:579–87, 1947.
15. FLESCH, R. The art of plain talk. New York: Harper & Bros., 1946.
16. ———. The art of readable writing. New York: Harper & Bros, 1949.
17. GALDSTON, IAGO. Motivation in health education, J. Am. Dietet. A., 25: 745–51, 1949.
18. ———. Nutrition from the psychiatric viewpoint, *ibid.*, 28:405–9, 1952.
19. GARRETT, ANNETTE. Interviewing: its principles and methods. New York: Family Service Association of America, 1950.
20. GEBHARD, B. Exhibit planning and analysis, J. Am. Dietet. A., 24:394–98, 1948.
21. HALL, DOROTHY. The dietetic interview as a tool in changing food habits, J. Am. Dietet. A., 22:999–1002, 1946.
22. HAMBURGER, W. W. The psychology of weight reduction: the initial nutritional interview; the nutritionist-patient relationship; and complications of weight reduction, J. Am. Dietet. A., 34:17–22, 1958.
23. HOULE, C. O. The dietitian as a teacher of adults, J. Am. Dietet. A., 24: 837–40, 1948.
24. HYMES, J. L. Significance of feeding from the viewpoint of child development, J Am. Dietet. A., 25:611–12, 1949.
25. ILG, F. L. The child's idea of what and how to eat, J. Am. Dietet. A., 24: 658–60, 1948.
26. KREITLOW, B. W. Teaching adults democratically, J. Am. Dietet. A., 33: 788–92, 1957.
27. LEACH, J. M. Motivating people to use educational material, J. Am. Dietet. A., 29:245–47, 1953.
28. MEAD, MARGARET. Cultural patterning of nutritionally relevant behavior J. Am. Dietet. A , 25:677–80, 1949.
29. MILLER, C. D. Food and food habits in the Hawaiian Islands, J. Am. Dietet. A., 27:461–66, 1951.
30. MITCHELL, HELEN S., and JOFFE, NATALIE F. Food patterns of some European countries: background for study programs and guidance of relief workers, J Am. Dietet. A., 24:676–87, 1944.
31. POSZ, A. C. Do you irritate others when you listen? J. Am. Dietet. A., 34: 730–32, 1958.
32. PRAGOFF, HALE. Areas of cooperation between medical social workers and dietitians, J. Am. Dietet. A., 24:485–90, 1948.
33. RABINOVITCH, R. D., and FISCHHOFF, J. Feeding in childhood to meet emotional needs: a survey of the psychologic implications of eating, J. Am. Dietet. A., 28:614–21, 1952.
34. RADKE, MARIAN, and CASO, E. K. Experiments in changing food habits, J. Am. Dietet. A., 23:403–9, 1947.

35. ——. Lecture and discussion—decision as method of influencing food habits, *ibid.*, 24:23–31, 1948
36. SPENCER, M. E An educator talks about motivating people, J. Am. Dietet. A., 25:209–12, 1949.
37. TOWLE, C. Common human needs ("Public Assistance Reports," No. 8.) Washington: Federal Security Agency, 1945.
38. TRULSON, M., WALSH, E. D., and CASO, E. K. A study of obese patients in a nutrition clinic, J. Am. Dietet. A., 23:941–46, 1947.
39 WALSH, ETHEL. Nutritionists and social workers cooperate on mutual problems, J. Am. Dietet. A., 25:681–83, 1949
40. WHITE, G. The patient as the focus of attention, J. Am. Dietet. A., 30:25–28, 1954.
41. DEPARTMENT OF PEDIATRICS, UNIVERSITY OF CHICAGO Liberal infant feeding, J Am. Dietet. A., 22:622–24, 1946.
42. Motivation in health education. (The 1947 Health Education Conference of the New York Academy of Medicine.) New York: Columbia University Press, 1948.

weighted in accordance with the findings from food consump studies in the United States for the years 1946–48, inclusive In most instances the values were computed for the size of porti commonly used, as suggested by Bowes and Church. Foods we listed as separate items when they deviated sufficiently in compos tion from the means of any group to alter significantly the valu obtained for any one nutrient. In the interest of brevity, certain foods which are highly seasonal in use or which occur infrequently in American diets were not included.

A significant improvement in the revised food composition table is in the use of physiologic fuel values for proteins, fats, and carbohydrates in place of Atwater's general values of 4-9-4. A brief discussion of the differences between Atwater's average or general values and the physiologic fuel values will make it clear that the former are not suitable for calculating the energy value of individua foods or diets which differ markedly in composition from the average American diet.

Proteins, fats, and carbohydrates from different food sources, when oxidized in a bomb calorimeter, differ appreciably in heat of combustion. For example, the heat of combustion of 1 gm. protein from meat, fish, or milk is 5.65 calories; that of 1 gm. protein from refined cereals is 5.80 calories; and that of 1 gm. protein from vegetables is 5.00 calories. Similarly, fats and carbohydrates from different food sources vary somewhat in heat of combustion when burned in the bomb calorimeter.

Some of the potential energy value of these foodstuffs is lost because of incomplete digestion and absorption. From digestibility studies on a large group of individuals it was found that, on the average, 97 per cent of the protein from animal foods is digested and absorbed, whereas 85 per cent of that from refined cereals and 83 per cent from vegetables are utilized. Thus the available energy from 1 gm animal protein is 97 per cent of 5.65 calories or 5.50 calories, whereas for vegetable proteins the available energy is only 83 per cent of 5.00 calories or 4.15 calories, a difference of more than 1 calorie per gram of protein.

Differences in the digestibility of fats and carbohydrates from

various food sources likewise alter the energy available from 1 gm. of these substances. Since fats and carbohydrates are completely metabolized by normal individuals, the energy value obtained after deducting the amount lost because of incomplete digestion and absorption constitutes the physiologic fuel value.

The absorbed amino acids, on the other hand, are not completely oxidized in the body, and some of the potential energy is lost in the nitrogenous waste products excreted in the urine. On the average,

TABLE 34

COMPARISON OF THE LONG AND SHORT METHODS OF DIETARY ANALYSIS
(Based on 21 Records for 3 Days)

Nutrient	Unit	Long Method	Short Method	Differences	Mean of Short Method in Percentage of Long Method
Calories . .		1,984	2,004	20	101.0
Protein. . .	gm.	65.8	65.1	0.7	98.9
Fat . .	gm.	89.0	88.3	0.7	99.2
Carbohydrate	gm	234.8	231.3	3.5	98.5
Calcium .	gm	0.94	0.96	0.02	102.1
Phosphorus	gm	1.16	1.16		100.0
Iron	mg	9.47	9.67	0.20	102.1
Vitamin A	I.U.	5,800	5,669	131	97.7
Ascorbic acid	mg	75.9	74.4	1.5	98.0
Thiamine .	mg	1.13	1.12	0.01	99.1
Riboflavin	mg	1.63	1.64	0.01	100.6
Niacin .	mg	11.66	11.60	0.06	99.4

this wastage amounts to 1.25 calories per gram of ingested protein. Consequently, in establishing the physiologic fuel value of different proteins, it is necessary to make a further deduction of 1.25 calories. This results in a physiologic fuel value for 1 gm. protein from meat, fish, and milk of 4.25 calories; from refined cereals, of 3.70 calories; and from vegetables, of 2.90 calories. These values show the great differences between the physiologic fuel values of proteins and demonstrate the error inherent in using 4 calories per gram for all proteins when dealing with individual foods or with special diets based on a limited variety of foods. Atwater's general values of 4-9-4 are the means of the physiologic fuel values for the proteins, fats, and carbohydrates comprising the average American diet

TABLE 35

Food Composition Table for Short Method of Dietary Analysis (2d Revision)

Food*	Approximate Measure	Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Calcium (Gm)	Phosphorus (Gm)	Iron (Mg)	Vitamin A (I U)	Ascorbic Acid (Mg)	Thiamine (Mg)	Riboflavin (Mg)	Niacin (Mg)
Cereal products refined	1 slice bread (30 gm); ⅔ cup cooked cereal and cereal products (20 gm dry), ¾–1 cup prep cereal (20 gm), 3 soda crackers (20 gm), 1½ cups popcorn (20 gm), 1 griddle cake (4 in diameter)		80	2 5	1	15	0 01	0 02	0 2			0 02	0 02	0 3
whole grain and enriched	1 slice bread (30 gm); ⅔ cup cooked cereal (20 gm dry); ¾–1 cup prepared cereal (20 gm), 2 Graham crackers (20 gm)		80	2 5	1	15	02	03	0 6	.		07	04	6
Dairy products. butter	1 teaspoon	5	35		4					165				
cheese, Cheddar type	1 cu. in.	30	125	7 5	10	1	22	15	0 3	420		01	13	.
cheese, cottage, skim	⅓ cup	100	95	19 5	1	2	10	19	0 3	20		02	31	.
cream, light	⅛ cup (for heavy cream add ½ serving butter)	30	60	1 0	6	1	03	02		250		01	04	1
custard	½ cup	130	150	7 0	7	15	15	16	0 6	440		06	26	1
egg	1 medium	50	80	6 5	6		03	10	1 4	570		05	14	1
ice cream	⅓ cup	80	165	3 0	10	16	10	08	0 1	420	1	03	15	1
milk: buttermilk, skim	1 cup	240	85	8 5		12	30	23	0 2		2	10	43	2
whole	1 cup	240	165	8 5	9	12	28	23	0 2	385	2	10	41	2
Desserts cake, plain, chocolate	1 piece cake 2¾×2¾×1¾ (75 gm), for iced add 1 serving sweets, 1 waffle, 6 in diameter (60 gm), 2½ doughnuts, cake type (add 1 serving fat)		250	5 0	8	40	09	10	0 4	140	.	02	06	2
cookies, plain	2 medium	40	175	2 5	5	30	01	03	0 4	100	...	02	02	.2
pie crust	⅙ shell, single crust	25	110	1 5	6	12	.	01	0 4		.	05	04	5
puddings, cream fillings	½ cup	140	150	4 5	5	22	0 14	0 13	0 1	225		0 04	0 22	0 1

* The nutritive value of food mixtures such as macaroni and cheese, Spanish rice, chow mein, creamed vegetables, soups, and so on should be computed on the basis of the kind and approximate amount of the foods in the combination.

TABLE 35—*Continued*

*Food**	*Approximate Measure*	Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Calcium (Gm)	Phosphorus (Gm)	Iron (Mg)	Vitamin A (I U)	Ascorbic Acid (Mg)	Thiamine (Mg)	Riboflavin (Mg)	Niacin (Mg)
Fats	2 slices bacon (*10 gm raw*), 1 tablespoon fat (12 gm), 1 tablespoon mayonnaise (15 gm), 1½ cu in salt pork (15 gm), 2 tablespoons French dressing (30 gm)		105	1 5	11			0 01	0 2	15	.	0 03	0 02	0 4
Fish														
cod, haddock, cooked	1 medium serving	75	55	13 5			0 01	15	0 4		1	04	0 06	1 6
halibut, herring, tuna, whitefish, cooked	1 medium serving *tuna* (60 gm), others (75 gm)	60	115	17 0	5		01	19	0 8	60		04	0 06	6 0
salmon, canned	1 medium serving	75	125	15 0	7		11	23	0 8	135		02	0 12	5 6
Fruits														
banana	1 small	100	90	1 0		22	01	03	0 6	430	10	04	0 05	0 7
cantaloupe	½ melon, 4½ in diameter	150	30	1 0		7	01	02	0 6	5,130	50	07	0 06	0 8
citrus	1 medium orange, ½ medium grapefruit, ½ cup juice, 1 medium large lemon	100	45	0 5		11	03	02	0 4	115	45	06	0 02	0 2
yellow—fresh, canned, dried	Fresh (100 gm), 1 medium peach, 2-3 apricots, 3 plums, dried (10 gm), *for sweetened*, canned, dried, or fresh, add ½ serving sweets		70	0 5		17	01	03	0 6	910	6	01	0 03	1 0
other—dried	3-4 dates, 1½-2 small figs, dried apple, ¼ cup raisins	30	80	0 5		20	03	03	0 9	15		04	0 03	0 3
other—fresh and canned	½ cup	100	55	0 5		13	01	01	0 4	95	4	04	0 03	0 2
Gravy, white sauce	¼ cup	65	105	2 5	8	6	07	06	0 2	225		04	0 11	0 2
Legumes														
beans, peas	½ cup cooked, dried (30 gm)		100	6 5		18	05	13	2 0	10	1	10	0 07	0 7
soybeans	½ cup cooked, dried (30 gm)		105	10 5	5	4	07	18	2 4	35		32	0 09	0 7
Meat														
beef, lamb, veal, cooked	1 medium serving	75	185†	21 5†	11†		01	15	2 3			07	0 17	3 7
fowl, cooked	1 medium serving	75	150	15 0	10		01	16	1 7			04	0 08	5 2
liver, cooked	1 small serving	60	125	14 0	5	6	01	29	4 7	32,100	19	16	2 18	8 0
luncheon meats, cooked	2 slices sausage, minced ham, dried beef, luncheon roll (30 gm), ½ frankfurter		85	6 0	7		01	05	0 9			08	0 08	0 8
pork, ham, cooked	1 medium serving	75	180†	21 5†	10†		0 01	0 16	2 2	..		0 47	0 17	3 5

† Tentative values based on R M Leverton and G V Odell, *The Nutritive Value of Cooked Meat* ("Miscellaneous Publications," No MP 40, Oklahoma Agricultural Experiment Station [Oklahoma State University, 1958]).

TABLE 35—*Continued*

Food*	Approximate Measure	Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Calcium (Gm)	Phosphorus (Gm)	Iron (Mg)	Vitamin A (I.U.)	Ascorbic Acid (Mg)	Thiamine (Mg)	Riboflavin (Mg)	Niacin (Mg)
Nuts	1 tablespoon peanut butter, 8–15 walnut halves, 16 peanuts, 12–15 almonds, 12 pecan halves	15	90	4 0	7	3	0 01	0 06	0 3		. . .	0 04	0 02	2 3
Sweets														
candy, sugar, syrup	1 tablespoon sugar, jelly, jam, syrup, honey, 1 serving plain Jello, plain candy (fondant or mints, 14 gm), 6-oz bottle soft drink	..	55			14	. .	.	..	..	. .	. . . .	. . .	. . . .
candy bar	1 2-oz chocolate-coated bar		290	4 0	15	34	06	09	1 1	65	..	04	.17	1 1
molasses, sorghum	1 tablespoon	20	50	.		13	04	01	1 8	.	. .	02	03	0 6
Vegetables														
cabbage—cooked and sauerkraut	¾ cup	100	25	1 5	.	5	05	03	0 5	90	30‡	05	05	0 3
cabbage, *raw*, cauliflower, cooked	1 cup cabbage (50 gm), ¾ cup cauliflower (70 gm)		15	1 0	.	3	02	03	0 5	50	22	.04	04	0.2
corn, parsnips, cooked	½ cup corn, 1 large parsnip	100	85	2 0	1	19	03	07	0 6	195	10§	07§	.09	0 6§
green and yellow,														
asparagus, cooked	⅔ cup	100	20	2 0		3	02	05	1 0	1,040	18	.13	17	1 2
broccoli, cooked	⅔ cup	100	30	3 0	.	5	13	08	1 3	3,400	74	07	.15	0 8
carrots, cooked	⅔ cup	100	30	0 5		7	03	03	0 6	12,500	4§	05	05	0 4§
green beans, cooked	¾ cup	100	25	1 5		5	04	02	0 7	660	14§	07	10	0 5§
leafy greens, cooked	½ cup spinach, turnip, kale, other greens	100	30	2 5	. . .	5	20‖	05	2 7	10,400	33§	08	21	0 6§
peas, fresh, cooked, canned	⅔ cup	100	70	4 0		13	02	09	1 8	630	25§	.25§	14§	2 3§
sweet potato, cooked	½ large	100	140	2 0	1	35	03	05	0 8	8,605	22§	10§	06§	0 7§
potato, cooked	1 small (100 gm); for fried add 1–2 servings fat, for French fried (50 gm) add 1–2 servings fat		85	2 0	.	19	01	06	0 7	20	14§	09§	03	1 0
tomato, fresh, canned, or juice	½ cup, 1 small tomato (100 gm); for 2½ tablespoons catsup (50 gm) add ½ serving sweets		20	1 0	..	4	01	02	0 5	1,035	18	.05	03	0 8
other, cooked	½ cup beets, eggplant, onions, etc	100	40	1 0	. . .	9	03	05	0 6	80	8	03	04	0 5
other, commonly served raw	2 pieces celery, 8 slices cucumber, ⅛ head lettuce	50	10	0 5	. .	2	0 02	0 02	0 2	105	4	0 02	0 03	0 2

‡ For sauerkraut, reduce by one-half   § For canned, reduce by one-half.   ‖ Calcium may be unavailable in chard, spinach, and beet greens.

and are suitable only when computing the energy value of such diets. Some specific energy factors for calculating caloric values of foods as compiled by the Bureau of Human Nutrition and Home Economics are given in Table 37 (p. 142).

The accuracy of the values in Table 35 was tested on two series of dietary records. These were computed first by the usual method, whereby each food item is calculated separately, and then by the short method. Series I consisted of 3-day dietary records for 21 high-school girls, and Series II, of 3-day records for 14 homemakers. Comparison of the results obtained by the two methods showed a high degree of accuracy for the values in the food composition table. The observed differences were shown by statistical tests to be due to errors in random sampling and not to real differences between the two methods In Table 34 is given a comparison of the mean values obtained by each of the two methods on the first series of dietary records. It also shows the means for the short method as percentages of the corresponding means for the long method. It is evident that the values in the food composition table are highly satisfactory, since in no instance was the deviation as much as 2.5 per cent.

To illustrate the use of the food composition table, a sample day's menu from the record of one of the homemakers is given below:

BREAKFAST

Tomato juice	1 serving
Oatmeal	1 serving
Cream (light)	2 servings
Sugar	2 teaspoons
Bread, white enriched	1 slice
Butter	1 teaspoon
Milk, whole	1 cup

LUNCH

Macaroni and cheese	1 serving
Head lettuce, French dressing	1 serving
Applesauce, sweetened	1 serving
Cupcake	1
Bread, whole wheat	1 slice
Butter	1 teaspoon
Milk, whole	1 cup

MIDAFTERNOON

Chocolate bar	1

DINNER

Liver	1 small serving
Potato, baked	1 small
Butter	2 teaspoons
Green beans, buttered	1 serving
Celery	2 pieces
Bread, white enriched	1 slice
Butter	1 teaspoon
Chocolate pie	1 serving
Milk, whole	1 cup

This day's menu may be summarized as follows in preparing to calculate the nutritive value from the figures in Table 35:

Foods	Servings
Cereals:	
refined	1
whole grain or enriched	4
Dairy products:	
butter	5½
cheese, Cheddar	1
cream, light	2
milk, whole	3¼
Desserts:	
cake, plain	⅔
pie crust	1
pudding	1
Fruit: other, fresh or canned	1
Meat: liver	1
Sweets: candy bar	1
Vegetables:	
green beans	1
potato	1
tomato	1
other, raw	1

The nutritive content of the day's diet is then computed by multiplying the values in the food composition table by the number of servings and adding the various sums.

The short method has been found to result in a considerable

saving of time without sacrificing accuracy. It should be pointed out, however, that the method is most satisfactory when applied to a varied diet.

REFERENCES

1. DONELSON, E. G., and LEICHSENRING, J. M. Food composition table for short method of dietary analysis (revised), J. Am. Dietet. A., 21:440, 1945.
2. WATT, B. K., and MERRILL, A. L. Composition of foods—raw, processed, prepared. (U.S. Department of Agriculture, "Agriculture Handbooks," No. 8) 1950.
3. BOWES, A. DEP., and CHURCH, C. F. Food values of portions commonly used. 6th ed. Philadelphia: College Offset Press, 1946
4. Consumption of food in the United States, 1909–1948. ("U.S. Department of Agriculture Miscellaneous Publications," No. 691.) 1949

APPENDIX 2

Food Values in Common Portions

This compact food composition table, for reference use in classwork and meal planning, will enable nurses, clinicians, extension workers, and students to compare quickly the nutritive value of foods and to estimate the nutritive value of diets.

Data are given in quantities that can be readily adjusted to servings of different sizes. Values for prepared foods and food mixtures have been calculated from typical recipes. Values for cooked vegetables are without added fat.

The following abbreviations are used: gm. for gram; mg. for milligram; I.U. for International Unit; cal. for calories; Tr. for trace. Ounce refers to weight; fluid ounce to measure.

TABLE 36

Nutrients in Household Quantities of Foods*

Food and Approximate Measure or Common Weight	Weight (Gm)	Water (Pct)	Food Energy (Cal)	Protein (Gm)	Fat (Gm)	Total Carbohydrate (Gm)	Calcium (Mg)	Iron (Mg)	Vitamin A Value (I U)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Value (Mg)	Ascorbic Acid (Mg)
Milk and Milk Products													
Buttermilk, from skim milk, 1 cup	246	90	85	9	Tr.	12	288	0 2	10	0 09	0 43	0 3	3
Milk, cow													
fluid, whole, 1 cup	244	87	165	9	10	12	288	2	390	.09	42	3	
fluid, nonfat (skim), 1 cup	246	90	85	9	Tr	13	303	2	10	09	.44	3	3
evaporated (undiluted), 1 cup	252	74	345	18	20	25	612	4	1,010	12	91	.5	3
condensed (undiluted), 1 cup	306	27	980	25	26	168	835	6	1,300	16	1 19	6	3
dry, whole, 1 tablespoon	8	4	40	2	2	3	76	0	110	02	12	.1	1
dry, nonfat solids, 1 tablespoon	8	4	30	3	Tr	4	98	0	Tr	03	15	1	1
Milk, goat, fluid, 1 cup	244	87	165	8	10	11	315	2	390	10	26	7	2
Cheese, 1 ounce													
Cheddar (1-in. cube)	30	37	115	7	9	1	206	3	400	01	12	Tr	0
Cheddar, processed	30	40	105	7	8	1	191	3	370	Tr	.12	Tr	0
cheese foods, Cheddar	30	43	90	6	7	2	162	2	300	01	16	Tr.	0
cottage, from skim milk	30	76	25	6	Tr	1	27	1	10	01	09	Tr	0
cream	30	51	105	3	10	1	19	1	410	Tr	.06	Tr.	0
Swiss	30	39	105	8	8	Tr	262	3	410	Tr.	11	Tr.	0
Cream, 1 tablespoon													
light	15	72	30	Tr	3	1	15	0	120	Tr	02	Tr	Tr.
heavy	15	59	50	Tr	5	Tr	12	0	220	Tr.	02	Tr.	Tr.
Beverages, 1 cup													
chocolate (all milk)	250	80	240	8	12	26	260	5	350	08	40	3	2
cocoa (all milk)	250	79	235	10	12	27	298	1 0	400	10	46	5	3
chocolate flavored milk	250	83	185	8	6	26	272	2	210	08	40	2	2
malted milk	270	78	280	12	12	32	364	8	680	18	56		3
Desserts													
blanc mange, 1 cup	248	76	275	9	10	30	290	2	390	08	40	2	2
custard, baked, 1 cup	248	77	285	13	13	28	283	1 2	840	11	49	2	1
custard pudding, canned, strained (infant food), 1 ounce	30	75	30	1	1	5	26	1	60	Tr	04	Tr	Tr.
Ice cream, plain													
⅙ of quart brick	81	62	165	3	10	17	100	1	420	03	15	1	1
8 fluid ounces	142	62	295	6	18	29	175	1	740	06	27	1	1

* Adapted from the more comprehensive tables in *Composition of Foods—Raw, Processed, Prepared* ("Agriculture Handbooks," No 8 [1950]) For sale at U S. Government Printing Office, Washington 25, D C. 35 cents.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm.)	Water (Pct.)	Food Energy (Cal.)	Protein (Gm.)	Fat (Gm.)	Total Carbohydrate (Gm.)	Calcium (Mg.)	Iron (Mg.)	Vitamin A Value (I.U.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Value (Mg.)	Ascorbic Acid (Mg.)
FATS, OILS, RELATED PRODUCTS													
Bacon, medium fat, broiled or fried, 2 slices	16	13	95	4	9	Tr.	4	0.5	0	0.08	0.05	0.8	0
Butter, 1 tablespoon	14	16	100	Tr.	11	Tr.	3	0	460[1]	Tr.	Tr.	Tr.	0
Fats, cooking (vegetable fats):													
1 cup	200	0	1,770	0	200	0	0	0	0	0	0	0	0
1 tablespoon	13	0	110	0	12	0	0	0	0	0	0	0	0
Lard, 1 tablespoon	14	0	125	0	14	0	0	0	0	0	0	0	0
Margarine, 1 tablespoon	14	16	100	Tr.	11	Tr.	3	0	460[2]	0	0	0	0
Oils, salad or cooking, 1 tablespoon	14	0	125	0	14	0	0	0	0	0	0	0	0
Salad dressings, 1 tablespoon:													
French	15	40	60	Tr.	5	3	0	0	0	0	0	0	0
home-cooked	17	68	30	1	2	3	15	.1	80	.01	.03	Tr.	Tr.
mayonnaise	13	16	90	Tr.	10	Tr.	2	.1	30	Tr.	Tr.	0	0
EGGS													
Eggs, raw, medium:													
1 whole	54	74	75	6	6	Tr.	26	1.3	550	.05	.14	Tr.	0
1 white	31	88	15	3	0	Tr.	2	.1	0	0	.08	Tr.	0
1 yolk	17	49	60	3	5	Tr.	25	1.2	550	.05	.06	Tr.	0
Eggs, dried, whole, 1 cup	108	5	640	51	45	3	205	9.5	4,040	.36	1.14	3	0
MEAT, POULTRY, FISH													
Beef, 3 ounces, without bone, cooked:													
chuck	90	51	265	22	19	0	9	2.6	0	.04	.17	3.5	0
hamburger	90	47	315	19	26	0	8	2.4	0	.07	.16	4.1	0
sirloin	90	54	255	20	19	0	9	2.5	0	.06	.16	4.1	0
Beef, canned:													
corned beef, medium fat, 3 ounces	90	59	180	22	10	0	17	3.7	0	.01	.20	2.9	0
corned beef hash, 3 ounces	90	70	120	12	5	6	22	1.1	Tr.	.02	.11	2.4	0
strained (infant food), 1 ounce	30	78	30	5	1	0	3	1.2	0	Tr.	.06	.9	0
Beef, dried, 2 ounces	60	48	115	19	4	0	11	2.9	0	.04	.18	2.2	0
Beef and vegetable stew, 1 cup	235	79	250	13	19	17	31	2.6	2,520	.12	.15	3.4	15
Chicken, canned, boned, 3 ounces	90	62	170	25	7	0	12	1.5	0	.03	.14	5.4	0
Chile con carne, canned (without beans), ½ cup	85	67	170	9	13	5	32	1.2	150	.01	.10	1.9	...

[1] Year-round average.

[2] Based on the average vitamin A content of fortified margarine. Most margarines manufactured for use in the United States have 15,000 I.U. of vitamin A added per pound; minimum federal specifications for fortified margarine require 9,000 I.U. per pound.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm.)	Water (Pct.)	Food Energy (Cal.)	Protein (Gm.)	Fat (Gm.)	Total Carbohydrate (Gm.)	Calcium (Mg.)	Iron (Mg.)	Vitamin A Value (I.U.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Value (Mg.)	Ascorbic Acid (Mg.)
MEAT, POULTRY, FISH—*Continued*													
Clams, raw, meat only, 4 ounces	120	80	90	15	2	4	109	7.9	110	0.11	0.20	1.8	......
Cod, dried, 1 ounce	30	12	105	23	1	0	14	1.0	0	.02	.13	3.1	0
Crab meat, canned or cooked, 3 ounces	90	77	90	14	2	1	38	.8	. .	.04	.05	2.1	......
Flounder, raw, 4 ounces	120	83	80	17	1	0	69	.9	.	.07	.06	1.9	......
Haddock, fried, 1 fillet (4 by 3 by ½ in.)	100	67	160	19	6	7	18	.6	.	.04	.09	2.6	......
Halibut, broiled, 1 steak (4 by 3 by ½ in.)	125	64	230	33	10	0	18	1.0		.08	.09	13.1	......
Heart, beef, raw, 3 ounces	90	78	90	14	3	1	8	3.9	30	.50	.75	6.6	5
Kidneys, beef, raw, 3 ounces	90	75	120	13	7	1	8	6.7	980	.32	2.16	5.5	11
Lamb, leg roast, cooked, 3 ounces	90	56	230	20	16	0	9	2.6	0	.12	.21	4.4	0
Lamb, canned, strained (infant food), 1 ounce	30	79	30	4	1	0	5	.7	0	.01	.07	1.1	0
Liver, beef, fried, 2 ounces	60	57	120	13	4	5	5	4.4	30,330	.15	2.25	8.4	18
Liver, canned, strained (infant food), 1 ounce	30	78	30	5	1	Tr.	7	2.0	5,440	.02	.61	1.8	......
Mackerel, canned, solids and liquid, 3 ounces	90	66	155	16	9	0	157	1.8	370	.05	.18	4.9	......
Oysters, meat only, raw, 1 cup (13–19 medium size oysters, selects)	240	80	200	24	5	13	226	13.4	770	.35	.48	2.8	......
Oyster stew, 1 cup with 6 to 8 oysters	240	80	245	17	13	14	262	7.0	820	.21	.46	1.6	......
Pork loin or chops, cooked, 3 ounces without bone	90	50	285	20	22	0	9	2.6	0	.71	.20	4.3	0
Pork, cured ham, cooked, 3 ounces without bone	90	39	340	20	28	Tr.	9	2.5	0	.46	.18	3.5	0
Pork luncheon meat, canned, spiced, 2 ounces	60	55	165	8	14	1	5	1.2	0	.18	.12	1.6	0
Salmon canned, pink, 3 ounces	90	70	120	17	5	0	159[9]	.7	60	.03	.16	6.8	0
Sardines, canned in oil, drained solids, 3 ounces	90	57	180	22	9	1	328	2.3	190	.01	.15	4.1	0
Sausage													
bologna, 1 piece (1 by 1½ in. in diam.)	211	62	465	31	34	8	19	4.6	0	.37	.40	5.7	0
frankfurter, 1 cooked	51	62	123	7	10	1	3	.6	0	.08	.09	1.3	0
pork, bulk, canned, 4 ounces	120	55	340	17	29	0	10	2.6	0	.23	.27	3.4	0
Scallops, raw, 4 ounces	120	80	90	17	Tr.	4	29	2.0	0	.05	.11	1.6	......
Shad, raw, 4 ounces	120	70	190	21	11	0		.6		.17	.27	9.6	......
Shrimp, canned, meat only, 3 ounces	90	66	110	23	1		98	2.6	50	.01	.03	1.9	0
Soups, canned, ready-to-serve													
beef, 1 cup	250	91	100	6	4	11	15	.5	......	......	......	......	......
chicken, 1 cup	250	94	75	4	2	10	20	.5	......	.02	.12	1.5	......
chicken, strained (infant food), 1 ounce	30	87	15	1	1	2	11	.1	70	Tr.	.03	1	Tr.
clam chowder, 1 cup	255	91	85	5	2	12	36	3.6	..	..		..	..
Tongue, beef, raw, 4 ounces	120	68	235	19	17	Tr.	10	3.2	0	.14	.33	5.7	0

[9] If bones are discarded, calcium content would be much lower. Bones equal about 2 per cent of total contents of can.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm)	Water (Pct.)	Food Energy (Cal)	Protein (Gm)	Fat (Gm)	Total Carbohydrate (Gm)	Calcium (Mg.)	Iron (Mg.)	Vitamin A Value (I.U.)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Value (Mg)	Ascorbic Acid (Mg.)
MEAT, POULTRY, FISH—*Continued*													
Tuna fish, drained solids, 3 ounces	90	60	170	25	7	0	7	1.2	70	0.04	0.10	10.9	0
Veal cutlet, cooked, 3 ounces without bone	90	60	185	24	9	0	10	3.0	0	.07[4]	.24[4]	5.2[4]	0
MATURE BEANS AND PEAS; NUTS													
Almonds, shelled, unblanched, 1 cup	142	5	850	26	77	28	361	6.2	0	.35	.95	6.5	Tr.
Beans, canned or cooked, 1 cup[5]													
red kidney	256	76	230	15	1	42	102	4.9	0	.12	.12	1.0	0
navy or other varieties with.													
pork and tomato sauce	261	71	295	15	5	48	107	4.7	220	.13	.09	1.2	7
pork and molasses	261	70	325	15	8	50	146	5.5	90	.13	.09	1.2	7
Beans, lima, dry, 1 cup	183	13	610	38	2	113	124	13.7	0	.88	.32	3.6	3
Brazil nuts, shelled, 1 cup	140	5	905	20	92	15	260	4.8	Tr.	1.21	...	...	...
Coconut, dried, shredded (sweetened), 1 cup	62	3	345	2	24	33	27	2.2	0	Tr.	Tr.	Tr.	0
Cowpeas, dry, 1 cup	200	11	685	46	3	123	154	13.0	60	1.84	.32	4.5	3
Peanuts, roasted, shelled, 1 cup	144	3	805	39	64	34	107	2.7	0	.42	.19	23.3	0
Peanut butter, 1 tablespoon	16	2	90	4	8	3	12	.3	0	.02	.02	2.6	0
Peas, split, dry, 1 cup	200	10	690	49	2	123	66	10.2	740	1.53	.56	6.3	4
Pecans, 1 cup halves	108	3	750	10	79	14	80	2.6	50	.77	.12	1.0	2
Soybeans, dry, 1 cup	210	7	695	73	38	73	477	16.8	230	2.25	.65	4.9	Tr.
Walnuts, English, 1 cup halves	100	3	655	15	64	16	83	2.1	30	.48	.13	1.2	3
VEGETABLES													
Asparagus[5]													
cooked, 1 cup cut spears	175	92	35	4	Tr.	6	33	1.8	1,820	.25	.30	2.1	40
canned green, 6 spears, medium size	126[5]	92	20	2	Tr.	3	18	1.8	770	.06	.08	.9	17
canned bleached, 6 spears, medium size	126[5]	92	20	2	Tr.	3	15	1.0	70	.05	.07	.8	17
Beans, *lima, immature*, cooked, 1 cup	160	75	150	8	1	29	46	2.7	460	.22	.14	1.8	24
Beans, snap, green, cooked, 1 cup	125	92	25	2	Tr.	6	45	.9	830	.09	.12	.6	18
Beets, cooked, diced, 1 cup	165	88	70	2	Tr.	16	35	1.2	30	.03	.07	.5	11
Broccoli, cooked, flower stalks, 1 cup	150	90	45	5	Tr.	8	195	2.0	5,100	.10	.22	1.2	111
Brussels sprouts, cooked, 1 cup	130	85	60	6	1	12	44	1.7	520	.05	.16	.6	61
Cabbage, 1 cup													
raw, shredded	100	92	25	1	Tr.	5	46	.5	80	.06	.05	.3	50
cooked	170[5]	92	40	2	Tr.	9	78	.8	150	.08	.08	.5	53

[4] Data assume cut to be prepared by braising or pot roasting. Use of proportionate quantity of drippings would add approximately 50 per cent more thiamine and niacin and 25 per cent more riboflavin

[5] *With 2 tablespoons liquid.*

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm.)	Water (Pct.)	Food Energy (Cal.)	Protein (Gm.)	Fat (Gm.)	Total Carbohydrate (Gm.)	Calcium (Mg.)	Iron (Mg.)	Vitamin A Value (I.U.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Value (Mg.)	Ascorbic Acid (Mg.)
VEGETABLES—*Continued*													
Carrots:													
raw, grated, 1 cup	110	88	45	1	Tr.	10	43	0.9	13,200	0.06	0.06	0.7	7
cooked, diced, 1 cup	145	91	45	1	1	9	38	.9	18,130	.07	.07	.7	6
canned, strained (infant food), 1 ounce	30	92	10	Tr.	0	2	7	.2	2,530	.01	.01	.1	1
Cauliflower, cooked, flower buds, 1 cup	120	92	30	3	Tr.	6	26	1.3	110	.07	.10	.6	34
Celery, 1 cup													
raw, diced	100	94	20	1	Tr.	4	50	.5	0	.05	.04	.4	7
cooked, diced	130	94	25	2	Tr.	5	65	.6	0	.05	.04	.4	6
Collards, cooked, 1 cup	190	87	75	7	1	14	473	3.0	14,500	.15	.46	3.2	84
Corn, sweet													
cooked, 1 ear (5 in. long)	140	75	85	3	1	20	5	.6	390[6]	.11	.10	1.4	8
canned, solids and liquid, 1 cup	165	80	170	5	1	41	10	1.3	520[6]	.07	.13	2.4	14
Cowpeas, immature seed, cooked, 1 cup	160	75	150	11	1	25	59	4.0	620	.46	.13	1.3	32
Cucumbers, raw, 6 slices (⅛ in. thick, center section)	50	96	5	Tr.	0	1	5	.2[7]	0[7]	.02	.02	.1	4
Dandelion greens, cooked, 1 cup	180	86	80	5	1	16	337	5.6	27,310	.23	.22	1.3	29
Endive, raw, 1 pound	480	93	90	7	1	18	359	7.7	13,600	.30	.53	1.8	49
Kale, cooked, 1 cup	110	87	45	4	1	8	248	2.4	9,220	.08	.25	1.9	56
Lettuce, head, raw, 2 large or 4 small leaves	50	95	5	1	Tr.	1	11	.2	270	.02	.04	.1	4
Mushrooms, canned, solids and liquid, 1 cup	244	93	30	3	Tr.	9	17	2.0	0	.04	.60	4.8	......
Mustard greens, cooked, 1 cup	140	92	30	3	Tr.	6	308	4.1	10,050	.08	.25	1.0	63
Okra, cooked, 8 pods (3 in. long, ⅝ in. diam.)	85	90	30	2	Tr.	6	70	.6	630	.05	.05	.7	17
Onions, raw:													
mature, 1 onion (2½ in. diam.)	110	88	50	2	Tr.	11	35	.6	60	.04	.04	.2	10
young green, 6 small onions without tops	50	88	25	Tr.	Tr.	5	68	.4	30	.02	.02	.1	12
Parsnips, cooked, 1 cup	155	84	95	2	1	22	88	1.1	0	.09	.16	.3	19
Peas, green													
cooked, 1 cup	160	82	110	8	1	19	35	3.0	1,150	.40	.22	3.7	24
canned, strained (infant food), 1 ounce	30	87	15	1	Tr.	2	5	.4	180	.03	.02	.3	2
Peppers, green, raw, 1 medium	76	92	15	1	Tr.	4	7	.3	400	.02	.04	.2	77
Potatoes													
baked, 1 medium (2½ in. diam.) peeled	99	74	95	2	Tr.	22	13	.8	20	.11	.05	1.4	17
boiled in skin, 1 medium (2½ in. diam.) peeled	142	78	120	3	Tr.	27	16	1.0	30	.14	.06	1.6	22
boiled after peeling, 1 medium (2½ in. diam.)	126	78	105	3	Tr.	24	14	.9	20	.12	.04	1.3	17
French-fried, 8 pieces (2 by ½ by ½ in.)	40	20	155	2	8	21	12	.8	20	.07	.04	1.3	11
potato chips, 10 medium (2 in. diam.)	20	3	110	1	7	10	6	.4	10	.04	.02	.6	2

[6] Vitamin A based on yellow corn; white corn contains only a trace.

[7] Based on pared cucumber; unpared contains about 0.6 mg. of iron and 130 I.U. vitamin A.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm.)	Water (Pct.)	Food Energy (Cal.)	Protein (Gm.)	Fat (Gm.)	Total Carbohydrate (Gm.)	Calcium (Mg.)	Iron (Mg.)	Vitamin A Value (I.U.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Value (Mg.)	Ascorbic Acid (Mg.)
VEGETABLES—*Continued*													
Pumpkin, canned, 1 cup	228	90	75	2	1	18	46	1.6	7,750	0.04	0.14	1.2	......
Radishes, raw, 4 small	40	94	5	Tr.	0	1	7	.2	10	.01	Tr.	.1	5
Rutabagas, cooked, cubed or sliced, 1 cup	155	91	50	1	Tr.	12	85	.6	540	.08	.11	1.1	33
Sauerkraut, canned, drained solids, 1 cup	150	91	30	2	Tr.	7	54	.8	60	.05	.10	.2	24
Soybean sprouts, raw, 1 cup	107	86	50	7	1	6	51	1.1	190	.24	.21	.9	14
Spinach:													
cooked, 1 cup	180	91	45	6	1	6	223[8]	3.6	21,200	.14	.36	1.1	54
canned, strained (infant food), 1 ounce	30	94	5	1	Tr.	1	22[8]	.4	1,190	.01	.03	.1	2
Squash:													
summer, cooked, diced, 1 cup	210	95	35	1	Tr.	8	32	.8	550	.08	.15	1.3	23
winter, baked, mashed, 1 cup	205	86	95	4	1	23	49	1.6	12,690	.10	.31	1.2	14
winter, canned, strained (infant food), 1 ounce	30	91	10	Tr.	Tr.	2	9	1	560	.02	.02	.1	1
Sweet potatoes, peeled, 1 sweet potato:													
baked (5 by 2 in.)	120	61	185	3	1	41	44	1.1	11,410[9]	.12	.08	.9	28
boiled (5 by 2½ in.)	205	69	250	4	1	57	62	1.4	15,780[9]	.18	.11	1.3	41
Tomatoes:													
raw, 1 medium E.P. (2 by 2½ in.)	150	94	30	2	Tr.	6	16	.9	1,640	.08	.06	.8	35
canned or cooked, 1 cup	242	94	45	2	Tr.	9	27	1.5	2,540	.14	.08	1.7	40
Tomato juice, canned, 1 cup	242	94	50	2	Tr.	10	17	1.0	2,540	.12	.07	1.8	38
Turnips, cooked, diced, 1 cup	155	92	40	1	Tr.	9	62	.8	Tr.	.06	.09	.6	28
Turnip greens, cooked, 1 cup	145	90	45	4	1	8	376	3.5	15,370	.09	.59	1.0	87
Vegetables, mixed, canned, strained (infant food), 1 ounce	30	90	10	Tr.	0	2	9	.3	[10]	.01	.01	.1	1
FRUITS													
Apples, raw, 1 medium (2½ in. diam.)	150	84	75	Tr.	1	20	8	.4	120	.05	.04	.2	6
Apple juice, fresh or canned, 1 cup	249	86	125	Tr.	0	34	15	1.3	90	.05	.07	Tr.	2
Apple betty, 1 cup	230	64	345	4	7	70	34	.2	370	.13	.09	1.1	3
Applesauce, canned, sweetened, 1 cup	254	80	185	1	Tr.	50	10	1.0	80	.05	.03	.1	3
Apricots:													
raw, 3 apricots	114	85	55	1	Tr.	14	17	.5	2,990	.03	.05	.9	7
canned in syrup, 4 medium halves and 2 tablespoons syrup	122	77	95	1	Tr.	26	12	.4	1,650	.02	.03	.4	5

[8] Calcium may not be usable because of presence of oxalic acid.

[9] If very pale varieties only were used, the vitamin A value would be very much lower.

[10] Vitamin A value ranges from 270 to 1,510 I.U. per ounce.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm)	Water (Pct)	Food Energy (Cal)	Protein (Gm)	Fat (Gm)	Total Carbohydrate (Gm)	Calcium (Mg)	Iron (Mg)	Vitamin A Value (I U)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Value (Mg)	Ascorbic Acid (Mg)
FRUITS—*Continued*													
Apricots—Continued													
canned, strained (infant food), 1 ounce	30	83	15	Tr.	Tr.	4	6	0.3	480	0.01	0.01	0.1	1
dried, cooked, unsweetened, fruit and liquid, 1 cup	285	75	240	5	Tr	62	80	4.6	6,900	.01	.14	2.8	9
Avocados, raw, ½ peeled fruit (3⅓ by 3¼ in.)	114	65	280	2	30	6	11	.7	330	.07	.15	1.3	18
Bananas, raw, 1 medium (6 by 1½ in.)	150	75	90	1	Tr	23	8	.6	430	.04	.05	.7	10
Blackberries, raw, 1 cup	144	85	80	2	1	18	46	1.3	280	.05	.06	.5	30
Blueberries, raw, 1 cup	140	83	85	1	1	21	22	1.1	400	.04	.05	.4	23
Cantaloupes, raw, ½ melon (5 in. diam.)	385	94	35	1	Tr	8	31	.7	6,190[11]	.09	.07	.9	59
Cherries, 1 cup pitted:													
raw	154	83	65	1	1	16	19	.4	710	.05	.06	.4	9
canned red sour	254	87	120	2	1	30	28	.8	1,840	.07	.04	.4	14
Cranberry sauce, sweetened, 1 cup	277	48	550	Tr	1	142	22	.8	80	.06	.06	.3	5
Dates, "fresh" and dried, pitted and cut, 1 cup	178	20	505	4	1	134	128	3.7	100	.16	.17	3.9	0
Figs, raw, 3 small (1½ in. diam.)	114	78	90	2	Tr	22	62	.7	90	.06	.06	.6	2
Figs, dried, 1 large (2 by 1 in.)	21	24	55	1	Tr	14	30	.6	20	.03	.02	.4	0
Fruit cocktail, canned, solids and liquid, 1 cup	256	81	180	1	1	48	23	1.0	410	.03	.03	.9	5
Grapefruit, raw, 1 cup sections	194	89	75	1	Tr	20	43	.4	20	.07	.04	.4	78
Grapefruit juice													
canned, unsweetened, 1 cup	246	89	90	1	Tr	24	20	.7	20	.07	.04	.4	85
frozen concentrate, 6 fluid ounce can	187	58	295	4	1	77	63	2.4	60	.24	.13	1.4	272
Grapes, 1 cup													
American type (slip skin)	153	82	85	2	2	18	20	.7	90	.07	.05	.3	3
European type (adherent skin)	160	82	100	1	1	26	26	.9	120	.09	.06	.4	6
Grape juice, bottled, 1 cup	254	81	170	1	0	46	25	.8		.09	.12	.6	Tr.
Lemon juice, fresh, 1 cup	246	91	60	1	Tr.	19	34	.2	0	.11	.01	.3	122
Lime juice, fresh, 1 cup	246	91	60	1	0	20	34	.2	0	.11	.01	.3	65
Oranges, 1 medium (3 in. diam.)	215	87	70	1	Tr	17	51	.6	290	.12	.04	.4	77
Orange juice													
fresh, 1 cup	246	88	110	2	Tr	27	47	.5	460	.19	.06	.6	122
canned, unsweetened, 1 cup	246	88	110	2	Tr	27	25	.7	240	.17	.04	.6	103
frozen concentrate, 6 fluid ounce can	187	58	300	5	1	73	69	2.0	670	.48	.11	1.5	285
Papayas, raw, cubed, 1 cup	182	89	70	1	Tr	18	36	.5	3,190	.06	.07	.5	102
Peaches													
raw, 1 medium (2½ by 2 in. diam.)	114	87	45	1	Tr.	12	8	.6	880	.02	.05	.9	8
canned in syrup, solids and liquid, 1 cup	256	81	175	1	Tr.	47	13	1.0	1,160	.02	.05	1.8	11
canned, strained (infant food), 1 ounce	30	83	15	Tr	Tr	4	2	.3	180	.01	.01	.2	1
dried, cooked, unsweetened, 1 cup (10–12 halves and 6 tablespoons liquid)	270	76	225	2	1	59	38	5.9	2,750	.01	.16	4.3	11

[11] Vitamin A based on deeply colored yellow varieties.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm.)	Water (Pct.)	Food Energy (Cal.)	Protein (Gm.)	Fat (Gm.)	Total Carbohydrate (Gm.)	Calcium (Mg.)	Iron (Mg.)	Vitamin A Value (I.U.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Value (Mg.)	Ascorbic Acid (Mg.)
FRUITS—*Continued*													
Pears:													
raw, 1 pear (3 by 2½ in. diam.)	182	83	95	1	1	24	20	0 5	30	0 03	0 06	0.2	6
canned in syrup, 2 medium-size halves and 2 tablespoons syrup	117	81	80	Tr.	Tr.	22	9	.2	Tr.	.01	02	.2	2
canned, strained (infant food), 1 ounce	30	86	15	Tr.	Tr.	4	3	.1	10	Tr.	.01	.1	Tr.
Persimmons, Japanese, raw, seedless kind, 1 persimmon (2½ in. diam.)	125	78	95	1	Tr.	24	7	.4	3,270	.06	.05	Tr.	13
Pineapple:													
raw, diced, 1 cup	140	85	75	1	Tr.	19	22	.4	180	.12	.04	.3	33
canned in syrup, 2 small or 1 large slice and 2 tablespoons juice	122	78	95	Tr.	Tr.	26	35	.7	100	.09	02	.2	11
Pineapple juice, canned, 1 cup	249	86	120	1	Tr.	32	37	1.2	200	.13	04	.4	22
Plums, raw, 1 plum (2 in. diam.)	60	86*	30	Tr.	Tr.	7	10	.3	200	.04	.02	3	3
Prunes, cooked, unsweetened, 1 cup (16–18 prunes and ⅓ cup liquid)	270	65	310	3	1	82	62	4 5	2,210	.07	.20	2 0	2
Prune juice, canned, 1 cup	240	80	170	1	0	46	60	4 3	....	.07	.19	1 0	2
Raisins, dried, 1 cup	160	24	430	4	1	114	125	5.3	80	.24	.13	.8	Tr.
Raspberries, red, raw, 1 cup	125	84	70	1	Tr.	17	49	1 1	160	.03	.08	.4	29
Rhubarb, cooked with sugar, 1 cup	272	63	385	1	Tr.	98	112[13]	1 1	70	02	.....	.2	17
Strawberries:													
raw, capped, 1 cup	149	90	55	1	1	12	42	1.2	90	.04	.10	.4	89
frozen, 3 ounces	90	72	90	1	Tr.	23	19	.5	30	02	.04	.2	35
Tangerines, 1 medium (2½ in. diam.)	114	87	35	1	Tr.	9	27	3	340	.06	.02	.2	25
Tangerine juice, canned, 1 cup	246	89	95	2	1	23	47	5	1,040	.15	.06	.6	64
Watermelons, ⅛ slice (1½ by 10 in.)	345	92	45	1	Tr.	11	11	.3	950	.08	.08	.3	10
GRAIN PRODUCTS													
Barley, pearled, light, dry, 1 cup	203	11	710	17	2	160	32	4.1	0	.25	.17	6 3	0
Biscuits, baking powder, enriched flour, 1 biscuit (2½ in. diam.)	38	27	130	3	4	20	83	.7	0	.09	08	.7	0
Bran flakes, 1 cup	40	4	115	4	1	32	24	2.0	0	.19	09	3 5	0
Breads, 1 slice:													
Boston brown, unenriched	48	44	105	2	1	22	89	1.2	70	.04	06	7	0
rye	23	35	55	2	Tr.	12	17	.4	0	04	02	.4	0
white, unenriched, 4 per cent nonfat milk solids[14]	23	35	65	2	1	12	18	1	0	.01	02	.2	0

[13] Calcium may not be usable because of presence of oxalic acid.

[14] When the amount of nonfat milk solids in commercial bread is unknown, use bread with 4 per cent nonfat milk solids.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm.)	Water (Pct.)	Food Energy (Cal.)	Protein (Gm.)	Fat (Gm.)	Total Carbohydrate (Gm.)	Calcium (Mg.)	Iron (Mg.)	Vitamin A Value (I.U.)	Thiamine (Mg.)	Riboflavin (Mg.)	Niacin Value (Mg.)	Ascorbic Acid (Mg.)
Grain Products—Continued													
Breads, 1 slice—Continued													
white, enriched, 4 per cent nonfat milk solids[13]	23	35	65	2	1	12	18	0.4[14]	0	0.06[14]	0.04[14]	0.5[14]	0
white, enriched, 6 per cent nonfat milk solids	23	34	65	2	1	12	21	4[14]	0	06[14]	04[14]	5[14]	0
whole wheat	23	37	55	2	1	11	22	5	0	07	03	7	0
Cakes:													
angel food, 2-inch sector (1/12 of cake, 8 in diam.)	40	32	110	3	Tr.	23	2	1	0	Tr.	.05	1	0
doughnuts, cake-type, 1 doughnut	32	19	135	2	7	17	23	2	40	05	04	4	0
foundation, 1 square (3 by 2 by 1¾ in.)	65	25	230	4	8	36	82	3	100[15]	02	05	.2	0
foundation, plain icing, 2-inch sector, layer cake (1/16 of cake, 10 in. diam.)	120	24	410	6	11	72	121	5	150[16]	03	08	.2	0
fruit cake, dark, 1 piece (2 by 2 by ½ in.)	30	23	105	2	4	17	29	8	50[16]	04	04	3	0
gingerbread, 1 piece (2 by 2 by 2 in.)	55	30	180	2	7	28	63	1.4	50	02	05	6	0
plain cake and cupcakes, 1 cupcake (2¾ in. diam.)	40	27	130	3	3	23	62	2	50[17]	01	03	.1	0
sponge, 2 inch sector (1/12 of cake, 8 in. diam.)	40	32	115	3	2	22	11	6	210	02	06	2	0
Cereal foods, dry, precooked (infant food), 1 ounce	30	6	105	4	1	21	185	9.6	0	.34	13	1.4[18]	0
Cookies, plain and assorted, 1 3 inch cooky	25	5	110	2	3	19	6	2	0	01	01	1	0
Corn bread or muffins made with enriched, degermed corn meal, 1 muffin (2¾ in. diam.)	48	40	105	3	2	18	67	9	60[19]	08	.11	6	0
Corn flakes, 1 cup	25	4	95	2	Tr.	21	3	3	0	01	02	4	0
Corn grits, degermed, cooked, 1 cup:													
unenriched	242	87	120	3	Tr.	27	2	2	100[20]	04	01	4	0
enriched	242	87	120	3	Tr.	27	2	7	100[20]	11	08	1.0	0
Crackers:													
graham, 4 small or 2 medium	14	6	55	1	1	10	3	3	0	04	02	2	0
soda, plain, 2 crackers (2½ in. diam.)	11	6	45	1	1	8	2	1	0	01	01	1	0
Farina, enriched, cooked, 1 cup	238	89	105	3	Tr.	22	7	5	0	10	07	4	0

[14] Iron, thiamine, riboflavin, and niacin are based on the minimum levels of enrichment specified in the standards of identity of breads proposed by the Federal Security Agency and published in the *Federal Register*, August 3, 1943.

[15] If fat used is butter or fortified margarine, the vitamin A value would be 350 I.U. *per square, and 520 I.U. per 2 inch sector*, iced.

[16] If fat used is butter or fortified margarine, the vitamin A value would be 120 I.U.

[17] If fat used is butter of fortified margarine, the vitamin A value would be 150 I.U. per cupcake.

[18] Based on products ranging from 0.7 to 1.9 mg. per ounce. The niacin value of some products is as high as 6.5 mg.

[19] Based on recipe using white corn meal, if yellow corn meal is used, vitamin A value is 120 I.U.

[20] Vitamin A based on yellow corn grits; white corn grits contain only a trace.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm)	Water (Pct)	Food Energy (Cal)	Protein (Gm)	Fat (Gm.)	Total Carbohydrate (Gm)	Calcium (Mg)	Iron (Mg)	Vitamin A Value (I U)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Value (Mg.)	Ascorbic Acid (Mg)
GRAIN PRODUCTS—*Continued*													
Macaroni, cooked, 1 cup													
unenriched	140	61	210	7	1	42	13	0 8	0	0 03	0 02	0 7	0
enriched	140	61	210	7	1	42	13	1 5	0	24	.15	2 0	0
Muffins, made with enriched flour, 1 muffin (2¾ in. diam)	48	37	135	4	4	20	99	8	50	09	.10	.7	0
Noodles, containing egg, unenriched, cooked, 1 cup	160	84	105	4	1	20	6	6	60	.05	03	.6	0
Oatmeal or rolled oats:													
cooked, 1 cup	236	85	150	5	3	26	21	1 7	0	.22	05	.4	0
precooked (infant food), dry, 1 ounce	30	7	105	4	1	19	225	8 9	0	36	10	7[21]	0
Pancakes, baked, wheat, with enriched flour, 1 cake (4 in. diam)	27	55	60	2	2	7	43	.4	50	.05	.06	3	Tr
Pies, 4 inch sector (9 in diam).													
apple	135	48	330	3	13	53	9	5	220	.04	02	3	1
custard	130	59	265	7	11	34	162	1 6	290	07	21	4	0
lemon meringue	120	47	300	4	12	45	24	6	210	04	.10	2	1
mince	135	43	340	3	9	62	22	3 0	10	09	05	.5	1
pumpkin	130	59	265	5	12	34	70	1 0	2,480	04	.15	4	0
Pretzels, 5 small sticks	5	8	20	Tr.	Tr.	4	1	0	0	Tr.	Tr.	Tr.	0
Rice, cooked, 1 cup:													
converted	176	72	205	4	Tr.	45	14	.5	0	10	02	1 9	0
white or milled	168	71	200	4	Tr.	44	13	.5	0	.02	01	.7	0
Rice, puffed, 1 cup	14	4	55	1	Tr.	12	3	3	0	01	01	1	0
Rolls, plain, enriched, 1 roll (12 per pound)	38	29	120	3	2	21	21	7[22]	0	09[22]	06[22]	8[22]	0
Spaghetti, unenriched, cooked, 1 cup	146	61	220	7	1	44	13	9	0	03	02	.7	0
Waffles, baked, with enriched flour, 1 waffle (4½ by 5½ by ½ in)	75	40	215	7	8	28	144	1 4	270	.14	20	1 0	0
Wheat flours:													
whole, 1 cup stirred	120	12	400	16	2	85	49	4 0	0	66	.14	5 2	0
all-purpose or family flour:													
unenriched, 1 cup sifted	110	12	400	12	1	84	18	9	0	.07	05	1 0	0
enriched, 1 cup sifted	110	12	400	12	1	84	18	3 2[23]	0	48[23]	.29[23]	3 8[23]	0
Wheat germ, 1 cup stirred	68	11	245	17	7	34	57	5 5	0	1 39	54	3 1	0
Wheat, shredded, 1 large biscuit, 1 ounce	30	6	100	3	1	23	13	1 0	0	.06	03	1 3	0

[21] Based on products ranging from 0 4 to 1 2 mg per ounce of cereal The niacin value of some products is as high as 6 5 mg per ounce

[22] Iron, thiamine, riboflavin, and niacin are based on the minimum levels of enrichment specified in the standards of identity of breads proposed by the Federal Security Agency and published in the *Federal Register*, August 3, 1943

[23] Iron, thiamine, riboflavin, and niacin are based on the minimum levels of enrichment specified in the standards of identity promulgated under the Food, Drug, and Cosmetics Act.

TABLE 36—*Continued*

Food and Approximate Measure or Common Weight	Weight (Gm)	Water (Pct)	Food Energy (Cal)	Protein (Gm)	Fat (Gm)	Total Carbohydrate (Gm)	Calcium (Mg)	Iron (Mg)	Vitamin A Value (IU)	Thiamine (Mg)	Riboflavin (Mg)	Niacin Value (Mg)	Ascorbic Acid (Mg)
SUGARS, SWEETS													
Candy, 1 ounce:													
Caramels	30	7	120	1	3	22	36	7	50	01	04	Tr.	Tr.
Chocolate, sweetened, milk	30	1	145	2	9	16	61	6	40	03	11	2	0
Fudge, plain	30	5	115	Tr	3	23	14[34]	1	60	Tr.	02	Tr.	Tr.
Hard	30	1	110	0	0	28	0	0	0	0	0	0	0
Marshmallows	30	15	90	1	0	23	0	0	0	0	0	0	0
Chocolate syrup, 1 tablespoon	20	39	40	Tr	Tr.	11	3[34]	3	.	..	...	...	...
Honey, strained or extracted, 1 tablespoon	21	20	60	Tr.	0	17	1	2	0	Tr.	01	Tr.	1
Jams, marmalades, preserves, 1 tablespoon	20	28	55	Tr	Tr	14	2	1	Tr.	Tr.	Tr.	Tr.	1
Molasses, cane, 1 tablespoon													
light	20	24	50			13[36]	33	9		01	01	Tr.	......
blackstrap	20	24	45			11[36]	116	2 3		02	04	3	......
Syrup, table blends, 1 tablespoon	20	25	55	0	0	15	9	8	0	0	Tr.	Tr.	0
Sugar, 1 tablespoon													
granulated, cane or beet	12	Tr	50	0	0	12			0	0	0	0	0
brown	14	3	50	0	0	13	10[37]	4	0	0	0	0	0
MISCELLANEOUS													
Beverages, carbonated, cola type, 1 cup	230	88	105			28					...	...	......
Bouillon cubes, 1 cube	4	5	2	Tr	Tr	0				.	07	1 0	0
Chocolate, unsweetened, 1 ounce	30	2	140	2	15	8	28[34]	1 2	20	01	06	3	0
Gelatin dessert, plain, ready-to-serve, 1 cup	230	85	155	4	0	36	0	0	0	0	0	0	0
Olives, pickled "mammoth" size, 10 olives													
green	65	75	70	1	7	2	48	9	160	Tr.	...	......	......
ripe, Mission variety	65	77	105	1	12	1	48	9	40	Tr.	Tr.	......	......
Pickles:													
dill, cucumber, 1 large (4 in long)	135	93	15	1	Tr.	3	34	1 6	420	Tr.	.09	.1	8
sweet, cucumber or mixed, 1 pickle (2¾ in long)	20	70	30	Tr.	Tr	5	3	3	20	0	Tr	Tr.	1
Sherbet,[38] ½ cup	96	68	130	1	0	29	48	0	0	02	07	0	0
Vinegar, 1 tablespoon	15		2	0	.	1	1	1	.	..	...	...	......
White sauce, medium, 1 cup	265	73	430	11	33	23	305	3	1,350	.09	41	.3	1
Yeast													
compressed, bakers', 1 ounce	30	71	25	3	Tr.	3	7	1 4	0	.13	59	8 0	0
dried brewers', 1 tablespoon	8	7	20	3	Tr.	3	8	1 5	0	.78	44	2 9	0

[34] The calcium contributed by chocolate may not be usable because of presence of oxalic acid, in that case the value would be 15 mg per ounce.

[35] Calcium may not be usable because of presence of oxalic acid

[36] Total sugars only.

[37] Calcium is based on dark brown sugar, value would be lower for light brown sugar.

[38] Based on 6 8 pounds to the gallon, factory packed.

APPENDIX 3

Specific Energy Factors for Calculating Caloric Values of Foods

TABLE 37

Food or Food Group	Physiological Energy Factors To Be Applied to the Nutrients in Foods*		
	Protein (Calories per Gram)	Fat (Calories per Gram)	Carbohydrate (by Difference) (Calories per Gram)
Milk, milk products	4.27	8.79	3.87
Meat, fish	4.27	9.02	†
Eggs	4.36	9.02	3.68
Separated fats:			
butter fat	.....	8.79	......
other animal fats	....	9.02	......
vegetable fats and oils, hydrogenated fats	....	8.84	......
Cereals:			
barley, light	3.55	8.37	3.95
corn meal, whole ground	2.73	8.37	4.03
corn meal, degermed	3.46	8.37	4.16
crackers, soda, plain	4.23	8.37	4.12
macaroni	3.91	8.37	4.12
noodles (with egg)	3.91	8.80	4.12
oatmeal, rolled oats	3.55	8.37	4.07
rice, polished	3.82	8.37	4.16
rye flour, whole grain	3.05	8.37	3.86
wheat, 97–100% extraction	3.59	8.37	3.78
wheat, 85–93% extraction	3.78	8.37	3.95
wheat, 70–74% extraction	4.05	8.37	4.12
other cereals, refined	3.87	8.37	4.12
Other foods:			
dry beans, peas, nuts	3.47	8.37	4.07‡
potatoes and starchy roots	2.74	8.37	4.03
other underground crops§	2.74	8.37	3.84
other vegetables	2.44	8.37	3.57
lemons, lemon juice	3.36	8.37	2.70
other fruits	3.36	8.37	3.60
sugar:			
disaccharide	.....	....	3.87
glucose	.....	....	3.68

* Based on data from William Olin Atwater, 12th *Annual Report of Storrs (Connecticut) Agricultural Experiment Station*, 1899, pp 69–110, and from more recent compilations made by the Bureau of Human Nutrition and Home Economics, U S. Department of Agriculture

† Brain, heart, kidney, liver, 3.87 calories per gram, tongue, shellfish, fish products, 4.11 calories per gram

‡ Soybeans and soya products, 1.68 calories per gram.

§ Vegetables such as beets, carrots, onions, parsnips, or radishes

APPENDIX 4

Dietary Analysis of Some Common Alcoholic Beverages

TABLE 38*

Food	Wt	Approximate Measure	Calories	Protein	Alcohol	CHO	Ca	P	Fe	Vitamins						Approx Excess		Fiber
										A	Thiamine	Riboflavin	Niacin	Ascorbic Acid	D	Acid	Base	
	(Gm)			(Gm)	(Gm)	(Gm)	(Mg)	(Mg)	(Mg)	(I U)	(mcg)	(mcg)	(Mg)	(Mg)	(I U)			(Gm)
Ale, mild	230	1 large glass, 8 oz	100	1.1	8.9	8.0	30	41	0.2	(0)	Tr	(69)	(0.5)	0	0			
Ale, mild	345	*1 bottle, 12 oz*	148	1.7	13.1	12.0	45	62	0.3	(0)	Tr	(102)	(0.7)	0	0			
Beer, average	240	1 large glass, 8 oz	114	1.4	8.9	10.6	10	62	0.0	(0)	Tr	72	0.5	0	0			
Beer, average	360	1 bottle, 12 oz	173	2.2	13.3	15.8	14	94	0.0	(0)	Tr	108	0.7	0	0			
Brandy, California	30	1 brandy glass	75		10.5													
Brandy, cognac	30	1 brandy glass	75		10.5													
Cider, fermented	180	*1 glass, 6 oz*	73		9.4	1.8												
Cordials, liqueurs as																		
Anisette	20	1 cordial glass	75		7.0	7.0												
apricot brandy	20	1 cordial glass	65		6.0	6.0												
Benedictine	20	1 cordial glass	70		6.6	6.6												
crème de menthe	20	1 cordial glass	68		6.0	7.0												
Curaçao	20	1 cordial glass	55		6.0	4.0												
Daiquiri		1 cocktail	124	0.1	15.1	5.2	4	5	0.1		14	1	Tr	9	0			
Eggnog, Christmas type	123	1 punch cup	338	3.9	15.0	18.0	44	74	0.7	84	35	113	Tr	Tr	21	2.5		
Gin, dry	43	1 jigger, 1½ oz	107		15.1													
Gin rickey		1 glass	153	Tr	21.0	1.3	2	1	Tr		7	Tr	Tr	4	0			
Highball		1 glass	170		24.0													
Manhattan		1 cocktail	167	Tr	19.2	7.9	2	1	Tr	35	36	2	Tr	(0)	0			
Martini		1 cocktail	143	0.1	18.5	0.3	5	1	0.1	4	Tr	Tr	Tr	(0)	0			
Mint julep		1 glass	217		29.2	2.7												
Old Fashioned		1 glass	183		24.0	3.5												
Planter's Punch		1 glass	177	0.1	21.5	7.9	4	3	0.1		14	1	Tr	8	0			
Rum	43	1 jigger, 1½ oz	107		15.1													
Rum sour		1 glass	165	0.2	21.0	3.7	4	4	Tr		20	Tr	Tr	14	0			
Tom Collins		1 cocktail	181	0.3	21.5	9.0	6	6	Tr	0	30	Tr	Tr	21	0			
Whiskey, rye	43	1 jigger, 1½ oz	122		17.2													
Whiskey, Scotch	43	1 jigger, 1½ oz	107		15.1													
Wine, California, red	100	1 wine glass	73	0.2	10.0	0.5												
Wine, California, sauterne	100	1 wine glass	85	0.2	10.5	4.0												
Wine, champagne, domestic	100	1 wine glass	85	0.2	11.0	3.0												
Wine, muscatelle or port	100	1 wine glass	160	0.2	15.0	14.0												
Wine, vermouth, French	100	1 wine glass	108		15.0	1.0												
Wine, vermouth, Italian	100	*1 wine glass*	170		18.0	12.0												

* Reprinted from Anna dePlanter Bowes, *Food Values of Portions Commonly Used* (7th ed., Philadelphia: Anna dePlanter Bowes [Northeast Corner, 7th and Delancey Streets, Philadelphia 6], 1951), p. 9.

NOTE: Data on alcoholic beverages have been enlarged by request from many people to include some popular cocktails. The recipes used for these mixed drinks were taken from published regulation ones for bartenders. There may be many deviations from the standard recipes. In computing the calories it was assumed that energy from alcohol is available. It was computed on the basis of 7.1 calories per gram of alcohol.

APPENDIX 5

Cholesterol, Fat, and Fatty Acid Content of Foods

TABLE 39

Cholesterol Content of Food Samples*

Food	Total Cholesterol (Gm/100 Gm Moist Weight)
Muscle meats:	
Beef round (medium fat)	0.125
Beef round (lean)	0.095
Veal shank	0.14
Veal breast	0.10
Pork spareribs	0.105
Variety meats:	
Liver:	
Lamb (4 samples)	0.61
Pork	0.42
Beef	0.32
Calf (4 samples)	0.36
Tripe	0.15
Sweetbreads	0.28
Shellfish:	
Oysters [illegible]	0.23
C[illegible]	0.28
O[illegible]	0.47
C[illegible]	0.145
Cheeses:	
American	0.16
American, processed	0.155
Swiss, processed	0.145
Monterey Jack	0.19
Velveeta	0.16
Limburger, processed	0.135
Pimento cream, processed	0.14
Butter	0.28
Egg yolk, dried	3.9
Egg yolk, fresh	2.0
Primex†	0.15
Brewer's yeast, dry†	0.68
Casein, raw	0.065
Milk, whole fluid (4 per cent fat)	0.009–0.013
Milk powder, skim (1 per cent fat)	0.004
Milk, skim fluid (1 per cent fat)	0.0004

* R. Okey, Cholesterol content of foods, J. Am. Dietet. A., 21: 341–44, 1945; B. Nataf, O. Mickelsen, A. Keys, and W. E. Petersen: The cholesterol content of cow's milk, J. Nutrition, 36: 495–506, 1948; W. Lange, Cholesterol, phytosterol, and tocopherol content of food products and animal tissues, J. Am. Oil Chem. Soc., 27: 414–22, 1950.

† Total digitonin precipitable sterol. These foods are known to contain sterols other than cholesterol.

TABLE 40

Cholesterol Content of Substances Used as Foods*

Food	*Total Cholesterol* (Gm/100 Gm Moist Weight)
Organs:	
Beef brain	2.36; 2.11
Beef heart	0.15; 0.14
Beef kidney	0.40; 0.41
Beef liver	0.26; 0.19
Beef lung	0.39; 0.35
Beef thymus (sweetbread)	0.25; 0.22
Heart muscle:	
Rabbit	0.20
"Av. mammal"	0.18
Hen	0.16
Pigeon	0.16
Duck, wild	0.16
Turtle	0.16
Skeletal muscle:	
Beef	0.06
Lamb	0.07
Pork	0.06
Rabbit, laboratory	0.05
Rabbit, wild	0.08
Veal	0.065
"Av. mammal"	0.087
Chicken, light	0.09
Chicken, dark	0.06
Hen	0.07
Duck	0.07
Pigeon	0.11
Codfish	0.05
Frog	0.04
Salmon	0.06
Shrimp	0.15
Turtle	0.06; 0.07
Eggs (hen's):	
Frozen whole	0.56
Frozen yolk	1.33
Liquid whole	0.518
Dehydrated whole	2.14
Dehydrated yolk	2.81
Fresh whole	0.468

* Recomputed by Okey (Cholesterol content of food, *J. Am. Dietet. A.*, 21: 341–44, 1945) to approximate raw food bases from dry-weight figures given in recent papers.

TABLE 41*—FAT, FATTY ACID, AND CHOLESTEROL CONTENT OF FOODS

Food†	Portion: Amount	Portion: Weight (Gm.)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Total Fatty Acids: Saturated (Gm)	Total Fatty Acids: Unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)	Cholesterol (Mg.)
						Cereals and Bread Products‡							
Cereals, cooked:													
barley, whole	½ c	30 (dry)	100	3.6	0.6	20	0.07	0.50	0.19	0.31	Trace	....	....
cornmeal, not degermed	½ c	20 (dry)	71	1.8	0.7	15	0.08	0.59	0.31	0.28		....	....
millet	½ c.	30 (dry)	98	3.0	0.9	22	0.10	0.75	0.21	0.50	0.04	....	....
oats, rolled	½ c.	20 (dry)	74	3.0	1.5	13	0.28	1.14	0.50	0.61	0.03	....	....
rice, brown	½ c	40 (dry)	240	3.0	0.7	31	0.20	0.54	0.31	0.22	0.01	....	....
wheat, whole	½ c	30 (dry)	100	3.8	0.6	21	0.10	0.47	0.14	0.27	0.05	....	....
Cereals, ready-to-eat													
bran flakes	1 c.	35	125	3.8	0.6	28	0.10	0.47	0.14	0.27	0.05	....	....
oat cereal	1 c.	25	100	3.6	1.8	18	0.34	1.36	0.60	0.73	0.03	....	....
popcorn, plain	1 c.	14	54	1.8	0.7	11	0.08	0.58	0.30	0.28	....	....	....
shredded wheat	1 c	30	100	2.9	0.7	23	0.11	0.55	0.17	0.32	0.05	....	....
Breadstuffs §													
white bread (L)	1 sl.	23	64	1.9	0.8	12	0.29	0.47	0.32	0.12	0.01	....	1
white bread (VF)	1 sl.	23	64	1.9	0.8	12	0.17	0.59	0.43	0.12	0.01	....	....
whole wheat, 100% (L)	1 sl.	23	55	2.1	0.6	11	0.20	0.37	0.23	0.11	0.01	....	....
whole wheat, 100% (VF)	1 sl	23	55	2.1	0.6	11	0.13	0.47	0.30	0.11	0.01	....	....
corn bread or muffin (MF)	1 pc.	70	153	4.7	3.3	26	1.46	1.67	1.22	0.37	0.02	0.02	33
corn bread or muffin (VF)	1 pc	70	153	4.7	3.3	26	1.10	2.00	1.51	0.37	0.03	0.02	32
baking powder biscuits (L)	2	78	258	6.1	8.0	40	3.30	4.30	3.34	0.60	0.01	0.01	9
baking powder biscuits (MF)	2	78	258	6.1	8.0	40	3.80	3.80	3.12	0.46	0.01	0.01	7
baking powder biscuits (VF)	2	78	258	6.1	8.0	40	2.13	5.47	4.36	0.60	0.01	0.01	3
coffee cake, rich (L) butter and sugar topping	1 pc.	70	265	2.4	17.0	35	7.75	8.40	6.62	1.00	0.02	0.06	43
coffee cake, rich (VF) butter and sugar topping	1 pc	70	265	2.4	17.0	35	3.88	12.27	10.32	1.30	0.02	0.02	21
cracker, Graham (L) 65/lb	2	14	55	1.1	1.4	10	0.56	0.77	0.61	0.10	....	....	1
cracker, Graham (VF) 65/lb	2	14	55	1.1	1.4	10	0.34	1.06	0.86	0.09	....	....	....
cracker, soda (L) 80/lb	2	11	47	1.1	1.1	8	0.44	0.60	0.48	0.10	....	....	1
cracker, soda (VF) 80/lb	2	11	47	1.1	1.1	8	0.35	0.79	0.68	0.08	....	....	....
muffins, plain (L)	2½ in	48	134	3.8	4.0	20	1.67	2.13	1.75	0.34	0.01	0.01	27
muffins, plain (MF)	2½ in	48	134	3.8	4.0	20	1.90	1.90	1.52	0.30	0.01	0.01	26
muffins, plain (VF)	2½ in.	48	134	3.8	4.0	20	1.18	2.62	2.13	0.34	0.01	0.01	23

* From M. G. Hardinge and H. Crooks, Fatty acid composition of food fats, J. Am. Dietet. A., 31: 1065–71, 1958.

† The letters in this column have the following meanings:
MF—Mixed hydrogenated animal and vegetable shortening.
VF—Hydrogenated vegetable shortening.
M—Vegetable margarine
B—Butter
L—Lard

‡ Foods with minimal fat content omitted.

§ Fatty acid values computed from ingr...

TABLE 41—*Continued*

Food‡	Portion: Amount	Portion: Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Total Fatty Acids: Saturated (Gm)	Total Fatty Acids: Unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)	Cholesterol (Mg)
Dairy Products													
Cheese, American process	1 oz	28	105	6.6	8.5	1	4.84	3.23	2.50	0.26	...	0.08	44
cream	1 oz	28	106	2.6	10.5	1	6.16	4.10	3.18	0.37	.	0.01	36
Cream													
light, 20% fat	1 Tbsp.	15	30	0.4	3.0	1	1.71	1.14	0.88	0.10	.	0.03	10
whipping, 35% fat	1 Tbsp	15	49	0.3	5.2	0.5	2.96	1.98	1.53	0.18	..	0.05	18
Egg, medium	1	50	77	6.1	5.5	0.3	1.67	3.56	2.09	1.15	0.16	0.10	234
Milk													
cow's, whole	1 c.	244	166	8.5	9.5	12	5.42	3.61	2.80	0.33	..	0.09	34
half and half	½ c	60	82	1.9	7.2	3	4.10	2.74	2.12	0.25	....	0.07	25
buffalo, Indian	3½ oz	100	100	4.0	7.5	4.7	4.13	3.00	2.57	0.07	.	0.07	....
camel, Indian	3½ oz	100	64	3.9	2.8	5.6	1.60	1.06	0.88	0.01			....
goat, U S A	3½ oz	100	73	3.8	4.5	4.5	2.95	1.33	0.86	0.06	.	0.17	
human	3½ oz	100	70	1.5	3.3	6.5	1.50	1.63	1.16	0.25	.	0.09	....
sheep, Indian	3½ oz	100	100	5.8	6.5	4.5	4.08	2.10	1.73	0.03	...	0.06	......
Dairy Food Substitutes‖													
Soybean milk, commercial type reconstituted or liquid	1 c	244	152	7.8	8.6	13	1.05	7.03	2.26	4.28	0.48	...	......
Soybean cheese—"Vege Chee"	½ sl	70	63	9.5	4.8	1.0	0.77	3.78	1.96	1.69	0.11		......
Desserts and Sweets‡													
Apple Brown Betty (B), (L) in bread crumbs	½ c.	115	172	2.0	3.3	35	1.76	1.38	1.03	0.20	Trace	0.03	13
Apple Brown Betty (M), (VF) in bread crumbs	½ c.	115	172	2.0	3.3	35	0.63	2.51	2.07	0.20	Trace	....	....
Blanc mange													
dairy milk	½ c.	[illegible]	235	4.2	4.7	30	2.68	1.70	1.30	0.17		0.04	17
soybean milk	½ c	122	210	3.5	3.2	19	0.40	2.64	0.85	1.61	0.18	...	......

‖ Fatty acid values computed from manufacturers' information.

‡ Fatty acid values computed from ingredients.

TABLE 41—*Continued*

Food	Portion: Amount	Portion: Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Total Fatty Acids: Saturated (Gm)	Total Fatty Acids: Unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)	Cholesterol (Mg.)
Desserts and Sweets—*Continued*													
Cake													
applesauce (MF)	1 pc	65	200	2 0	7 6	32	3 61	3 61	3 03	0 51	Trace	Trace	33
applesauce (VF)	1 pc	65	200	2 0	7 6	32	1 80	5 42	4 55	0 65	Trace	Trace	28
fruit (MF)	1 pc	30	106	1 6	4 1	17	1 33	2 57	1 83	0 70	Trace	Trace	22
fruit (VF)	1 pc	30	106	1 6	4 1	17	0 70	3 20	2 34	0 70	Trace	Trace	19
plain (MF)	1 pc.	55	180	3 5	4 5	31	2 13	2 13	1 75	0 34	0 02	0 01	29
plain (VF)	1 pc	55	180	3 5	4 5	31	1 15	3 12	2 57	0 38	0 02	0 01	25
Cookies													
sugar (L)	3-in diam	20	64	1 0	2 6	9	1 01	1 46	1 11	0 25	0 01	Trace	12
sugar (VF)	3-in diam	20	64	1 0	2 6	9	0 62	1 85	1 53	0 25	0 01	Trace	10
oatmeal (L)	3½-in diam	25	114	1 6	4 4	17	1 67	2 51	1 88	0 50	0 01	. . .	11
oatmeal (VF)	3½-in diam	25	114	1 6	4 4	17	1 00	3 18	2 59	0 50	0 01	. . . .	8
Custard													
dairy milk	½ c.	124	140	6 0	6 0	16	2 79	2 91	2 00	0 57	0 01	0 10	107
soybean milk	½ c.	124	140	6 0	6 0	16	1 20	4 50	2 05	2.17	0 26	0.06	94
Ice cream, vanilla	½ c	70	147	2 8	8 9	15	5 07	3 39	2 62	0 31	. . . . .	0 09	30
Imitation ice cream (MF)	½ c	70	135	2 8	7 0	15	2 99	3 66	3 13	0 19	. . . . .	. . . .	. . . .
(Mellorine) (VF)	½ c	70	135	2 8	7 0	15	1.26	5 39	4 99	0 11	. . . . .	. . . .	. . . .
Pie													
cream, filling (B) crust (L)	⅙ med	160	338	5 7	13 0	48	5 80	6 50	4 94	1 05	0 05	0.10	103
cream, filling (M) crust (VF)	⅙ med	160	338	5 7	13 0	48	3 83	8 52	6 67	1 11	0 05	0 06	89
custard, crust (L)	⅙ med	160	328	7 4	13 5	44	5 77	7.06	5 26	1 15	0 06	0 09	115
custard, crust (VF)	⅙ med	160	328	7 4	13 5	44	4 49	8 34	6 54	1 15	0.06	0 09	107
lemon, filling (B) crust (L)	⅙ med	160	300	3 6	11 2	46	4 47	6 17	4 58	1 06	0 05	0 06	84
lemon, filling (M) crust (VF)	⅙ med.	160	300	3 6	11 2	46	2 55	8 09	6 60	1 06	0 06	0.04	78
pumpkin, crust (L)	⅙ med	160	325	6 5	12 1	40	5 06	6 44	4 95	1 03	0 05	0 07	115
pumpkin, crust (VF)	⅙ med.	160	325	6 5	12 1	49	3 68	7 82	6 33	1 03	0 05	0 07	107
raisin, filling (B) crust (L)	⅙ med	160	395	3 1	11 4	70	4 55	6 28	4 77	1 08	0 05	0 06	19
raisin, filling (M). crust (VF)	⅙ med.	160	395	3 1	11 4	70	2 60	8 23	7 04	1 08	0 05	0 04	0

TABLE 41—*Continued*

Food†	Portion: Amount	Portion: Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Total Fatty Acids: Saturated (Gm)	Total Fatty Acids: Unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)	Cholesterol (Mg)
						Desserts and Sweets—Continued							
Pie crust													
double 8" diam (L)	⅛ med	35	170	2.6	9.4	19	3.75	5.18	4.11	0.71			15
double 8" diam (VF)	⅛ med	35	170	2.6	9.4	19	2.14	6.79	5.80	0.71			
bottom 8" diam (L)	⅛ med	20	94	1.5	5.4	11	2.15	2.98	2.36	0.41			8
bottom 8" diam (VF)	⅛ med	20	94	1.5	5.4	11	1.23	3.90	3.33	0.41			
Candy													
chocolate creams (35 pc/lb)	2 pc	28	110	1.1	4.0	20	2.28	1.51	1.37	0.11		0.01	2
chocolate fudge (15 pc/lb)	1 pc	28	116	0.5	3.2	23	1.82	1.22	1.06	0.09		0.01	2
peanut brittle	1 oz	28	133	3.4	5.0	19	0.95	3.80	2.42	1.24			
						Fats, Oils, and Oily Foods							
Butter, 1 square	½ Tbsp	7	50		5.7		3.25	2.17	1.68	0.20		0.06	20
Cacao butter	½ oz	14	124		14.0		7.98	5.32	5.05	0.27			
Lard	1 Tbsp	14	126		14.0		5.59	7.71	6.12	1.06			15
Margarine	1 Tbsp	14	100		11.3		2.15	8.59	7.20	0.75			
Tallow													
beef	1 Tbsp	14	126		14.0		7.05	6.25	5.50	0.27	0.07		15
mutton	1 Tbsp	14	126		14.0		7.58	5.72	5.19	0.53			17
Vegetable oils													
corn	1 Tbsp	14	124		14.0		1.50	12.08	4.20	7.88			
cottonseed	1 Tbsp	14	124		14.0		3.33	10.00	3.33	6.65			
olive	1 Tbsp	14	124		14.0		1.60	11.70	10.77	0.91			
peanut	1 Tbsp	14	124		14.0		2.66	10.64	7.18	3.46			
poppyseed	1 Tbsp	14	124		14.0		1.46	11.84	2.70	9.04			
rapeseed	1 Tbsp	14	124		14.0		0.80	12.50	2.39	2.93	0.40		
safflower	1 Tbsp	14	124		14.0		0.93	12.37	2.66	9.31	0.40		
sesame	1 Tbsp	14	124		14.0		1.86	11.44	5.59	5.59			
soybean	1 Tbsp	14	124		14.0		1.73	11.57	3.72	7.05	0.80		
sunflower	1 Tbsp	14	124		14.0		1.60	11.70	3.33	8.25			
teaseed	1 Tbsp	14	124		14.0		1.33	11.97	10.91	1.06			

TABLE 41—*Continued*

Food†	Portion: Amount	Portion: Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Total Fatty Acids: Saturated (Gm)	Total Fatty Acids: Unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)	Cholesterol (Mg)
Fats, Oils, and Oily Foods—*Continued*													
Palm oils													
babassu	1 Tbsp	14	124	...	14.0	...	11.30	2.00	1.86	...	...	...	...
coconut	1 Tbsp	14	124	...	14.0	...	12.24	1.10	0.80	0.27	...	...	...
cohune	1 Tbsp	14	124	...	14.0	...	11.84	1.46	1.33	0.13	...	...	...
murumuru	1 Tbsp	14	124	...	14.0	...	11.84	1.46	1.33	0.06	...	...	...
palm	1 Tbsp.	14	124	...	14.0	...	6.38	6.92	5.72	1.20	...	...	...
palm kernel	1 Tbsp	14	124	...	14.0	...	11.04	2.26	2.00	0.13	...	...	...
Marine oils													
herring	1 Tbsp	14	126	...	14.0	...	2.93	10.37	2.79	...	...	3.72	...
menhaden	1 Tbsp	14	126	...	14.0	...	3.32	10.00	2.00	0.93	0.40	2.26	...
sardine	1 Tbsp	14	126	...	14.0	...	2.39	10.90	3.19	...	...	3.46	...
whale	1 Tbsp.	14	126	...	14.0	...	3.32	10.00	4.66	...	...	2.00	70
Salad dressings **													
French or mayonnaise-type with corn oil	1 Tbsp	15	58	...	5.4	3	0.62	4.51	2.31	2.15	...	...	...
with cottonseed oil	1 Tbsp	15	58	...	5.4	3	1.28	3.85	1.28	2.56	...	...	...
Average	1 Tbsp.	15	58	...	5.4	3	0.97	4.16	1.80	2.36	...	...	...
Mayonnaise													
with corn oil	1 Tbsp.	13	92	...	10.0	...	1.14	8.36	4.28	3.99	...	...	...
with cottonseed oil	1 Tbsp	13	92	...	10.0	...	2.37	7.13	2.38	4.75	...	...	...
Average	1 Tbsp	13	92	...	10.0	...	1.80	7.70	3.33	4.37	...	...	...
Legumes													
Soybeans, plain cooked	½ c.	32 (dry)	105	11	5.8	11	0.72	4.70	1.54	2.92	0.33	...	...
Broad beans, plain cooked	½ c	32 (dry)	108	8	0.54	18	0.04	0.47	0.23	0.19	...	...	...
Garbanzo (chick peas)	½ c.	32 (dry)	115	6.7	1.5	19	0.13	1.30	0.73	0.55	...	...	...
Mung beans	½ c.	32 (dry)	108	7.8	0.45	19	0.17	0.26	0.08	0.17	...	...	...

** Warm climates, cottonseed oil throughout year, cold climate, corn oil in winter.

TABLE 41—*Continued*

Food†	Portion: Amount	Portion: Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Total Fatty Acids: Saturated (Gm)	Total Fatty Acids: Unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm.)	Cholesterol (Mg)
Meat and Poultry—Raw Edible Portions unless Stated Otherwise													
Bacon	2 sl	16	97	4.0	8.8	.	3.09	5.27	4.43	0.75	0.04	0.03	16
Beef													
chuck	3½ oz	100	224	18.6	16.0		6.84	8.36	7.90	0.30	0.07	0.05	.
roast	3½ oz	100	281	27.4	23.0		9.18	12.67	12.02	0.28	0.10	0.04	....
round	3½ oz	100	182	19.5	11.0		4.70	5.75	5.43	0.21	0.05	0.03	125
Chicken													
fryer	3½ oz	100	150	20.2	7.2		2.33	4.51	2.05	2.26	0.11	0.11	60–90
roasting	3½ oz	100	200	20.0	12.6		3.83	8.14	5.63	2.27	0.13	0.07	60–90
stewing	3½ oz	100	302	18.0	25.0		5.94	17.81	11.16	6.18	0.19	0.14	60–90
Duck, domestic	3½ oz	100	326	16.0	28.6		7.34	19.83	11.41	6.52	0.38	0.05	. .. .
Goose, domestic	3½ oz	100	354	16.4	31.5		8.98	20.95	17.06	2.39	0.12	. .	.. ..
Ham													
canned (Prem)	2 oz	57	164	8.4	13.8		5.24	7.87	6.55	1.18	0.08	0.05	70–105
pan broiled	3½ oz	100	344	15.2	31.0		10.60	18.85	16.20	2.36	0.15	0.12	70–105
Lamb													
chop	3½ oz	100	356	14.9	32.4		17.85	12.93	12.00	0.40	0.21	0.09	70
leg	3½ oz	100	235	18.0	17.5		9.15	7.48	6.82	0.28	0.15	0.07	70
Pigeon	3½ oz	100	279	18.6	22.1		4.83	16.17	11.76	3.57	0.15	....	....
Pork													
loin or chops	3½ oz	100	296	16.4	25.0		9.50	14.25	12.11	1.90	0.17	0.05	70–105
ground	3½ oz	100	416	13.0	40.0		14.44	23.56	19.00	3.04	0.23	0.08	70–105
Rabbit, domestic	3½ oz.	100	175	20.8	10.2		3.78	5.91	3.59	1.16	0.19	0.19	. .. ...
Turkey													
dark meat	3½ oz	100	177	23.2	9.6		2.74	6.38	4.20	1.82	0.07	0.13	16–26
light meat	3½ oz	100	159	24.5	4.6		1.31	3.10	1.07	0.96	0.03	0.07	8–15
skin, roasted	3½ oz	100			26.7		7.10	18.27	12.69	5.07	0.23	0.25	.. .

TABLE 41—*Continued*

Food†	Portion: Amount	Portion: Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm.)	Total Fatty Acids: Saturated (Gm)	Total Fatty Acids: Unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)	Cholesterol (Mg)
						Nuts, Oily Fruits, and Seeds							
Nuts, raw or roasted ††													
almond	12–15	15	90	2.8	8.1	3.0	0.23	7.46	5.93	1.54	...	...	...
Brazil	2 med	15	97	2.2	9.9	1.7	1.77	7.43	4.52	2.82	...	...	...
cashew	6–8	15	88	2.8	7.2	4.1	0.96	5.88	4.79	1.03	...	...	...
coconut													
fresh	½ oz	15	54	0.5	5.2	2.1	4.54	0.40	0.29	0.10	...	...	...
shredded, dried	2 Tbsp	15	83	0.5	5.9	8.0	5.16	0.45	0.34	0.11	...	...	...
filbert (hazelnut)	10–12	15	95	1.9	9.1	2.7	0.52	8.13	5.28	1.21	...	...	...
peanut	15–17	15	84	4.0	6.6	3.5	1.25	5.02	3.39	1.63	...	...	...
peanut butter													
non-hydrogenated	1 Tbsp	16	92	4.2	7.8	3.0	1.48	5.93	4.00	1.93	...	...	...
hydrogenated	1 Tbsp	16	94	4.1	8.0	3.0	1.70	5.70	3.85	1.85	...	...	...
pecan	12 halves	15	104	1.4	11.0	2.0	0.63	9.82	7.42	2.30	...	...	...
pine nuts													
pignolia (*P pinea*)	¼ c (scant)	15	90	5.1	7.4	1.0	0.56	6.47	3.02	3.44	...	...	...
pinones (*P monophylla*)	¼ c (scant)	15	70	1.4	3.4	8.0	0.29	2.94	1.94	1.00	...	...	...
pistachio	30 nuts	15	88	2.9	8.0	2.8	1.14	6.46	4.94	1.52	...	...	...
walnuts													
black	8–10 halves	15	94	2.7	8.7	2.8	0.50	7.77	2.98	4.14	0.64	...	...
English	8–15 halves	15	98	2.3	9.7	2.3	0.65	8.57	2.12	6.18	0.28	...	...
Macadamia nut	8 halves	15	115	1.4	11.7	1.2	1.78	9.34	6.67	0.22	...	...	...
Fruits, oily													
avocado	¼ c (cubed)	75	185	1.3	20.0	4	3.80	15.20	12.54	2.66	...	...	...
olives	6 "mammoth"	40	76	0.7	8.4	1	0.96	7.02	6.46	0.56	...	...	...
Seeds													
alfalfa, U S grown	1½ Tbsp	15	57	5.4	1.7	5	0.16	1.45	0.11	1.15	0.18	...	...
flaxseed, U S grown	1½ Tbsp	15	80	4.0	5.3	4	0.50	4.53	1.21	0.91	2.41	...	...
poppyseed	1½ Tbsp	15	77	2.7	6.0	3	0.63	5.07	1.18	3.88	...	...	...
sesame	1½ Tbsp	15	85	2.9	7.6	3	1.01	6.21	3.03	3.28	...	...	...
sunflower	1½ Tbsp	15	80	4.0	6.4	3	0.73	5.35	1.52	3.77	...	...	...
pumpkin	½ oz	15	81	4.6	6.4	3	0.97	5.11	1.95	3.10	...	...	...
squash	½ oz	15	80	4.0	6.4	3	1.88	4.20	1.52	2.68	...	...	...
watermelon	½ oz	15	80	4.0	6.4	3	1.22	4.86	1.16	3.65	...	...	...

†† Roasted nuts—fatty acid composition similar to raw nuts Approximately 1 gm of roasting oil (peanut, corn, cottonseed, or coconut) retained per 100

TABLE 41—Continued

Food	Portion: Amount	Portion: Weight (Gm)	Calories	Protein (Gm)	Fat (Gm)	Carbohydrate (Gm)	Total Fatty Acids: Saturated (Gm)	Total Fatty Acids: Unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)	Cholesterol (Mg)
Prepared Plant Proteins													
Commercially prepared plant proteins ‡‡													
a) low fat "gluten" type entrees Cutletburger and Vegeburger	2 oz	60	62	10.8	0.55	4	0.08	0.44	0.13	0.26	0.04	......	......
dinner cuts, ground wheat gluten, Veelets, and Vege-cuts (average)	2 oz	60	50	9.0	0.30	3	0.05	0.24	0.07	0.14	0.02	......	......
b) medium-fat entrees													
Linketta	2 oz	60	115	12.9	6.2	3	1.35	4.54	3.36	0.88	....	......	......
Numete	2 oz	60	150	7.9	10.1	7	2.11	7.48	5.09	2.39	....	......	......
Nuteena	2 oz	60	125	7.2	7.2	8	1.37	5.47	3.49	1.91	0.03	......	......
Proast	2 oz	60	110	13.9	3.2	8	0.55	2.40	1.55	0.91	....	......	......
Proteena	2 oz	60	115	11.4	5.1	5.4	0.97	3.88	2.48	1.36	0.03	......	......
Vegelona	2 oz	60	85	15.2	3.6	4	0.75	2.67	1.92	0.65	....	......	......
Vegeleta N' Gravy	2 oz	60	80	6.5	3.6	5	0.48	2.94	1.50	1.30	0.14	......	......
Vegebits	2 oz	60	75	10.2	2.4	5	0.52	1.76	1.28	0.36	0.02	......	......
Weighted average of group b	2 oz	60	120	10.8	6.0	9	1.14	4.56	3.08	1.42	0.02	......	......
Sandwich spreads													
Loma Linda	2 Tbsp	32	46	2.5	2.7	3	0.41	2.15	1.49	0.64	.	......	......
Worthington	2 Tbsp	32	75	4.1	5.3	3	0.60	4.44	2.27	2.17		......	......
Home made vegetarian entrees ‡‡													
carrot roast with peanut butter	½ c	140	360	14.0	27.0	19	5.90	10.75	13.59	5.90	0.02	0.02	43
garbanzo loaf	½ c	140	182	7.0	7.5	22	1.57	5.56	4.35	0.86	0.02	0.02	33
soybean loaf	½ c	135	176	9.0	7.5	19	1.85	5.28	2.99	2.00	0.21	0.03	50
walnut timbale	½ c	150	290	9.3	18.0	24	3.76	13.34	5.13	4.96	0.31	0.05	77
Miscellaneous													
Chocolate, unsweetened	1 oz	28	143	1.6	15.0	8	8.55	5.70	5.42	0.28	[illegible]	[illegible]	[illegible]
Cocoa powder	1 Tbsp	14	42	1.2	3.4	6.8	1.94	1.29	1.23	0.06	[illegible]	[illegible]	[illegible]
Rice													
bran	1 oz	28	94	3.4	3.6	12	0.62	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
polished	1 oz	28	105	1.4	2.0	23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wheat germ	¼ c	34	123	8.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

‡‡ Fatty acid values computed from manufac[illegible]

TABLE 42*

Supplementary Table on Food Composition

Food	Serving: Amount	Serving: Weight (Gm)	Calories	Protein: Animal (Gm)	Protein: Vegetable (Gm)	Fat: Animal (Gm)	Fat: Vegetable (Gm)	Fat: Cholesterol (Mg)	Carbohydrate (Gm)	Fatty Acids: Total saturated (Gm)	Fatty Acids: Total unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)
Bread Products															
Bread, white	1 sl.	23	61	0.2	1.6	0.7	0.2	0.8	11	0.27	0.53	0.37	0.15	0.01	—
Doughnut, plain (made with hydrogenated vegetable shortening, fried in hydrogenated beef fat)	1	32	139	0.7	1.7	5.7	1.0	26.6	17	2.59	3.77	3.53	0.21	0.02	0.01
French toast, grilled with 1 tsp. butter	1 sl.	—	153	3.4	1.6	7.9	0.2	143.7	15	3.87	3.83	2.86	0.79	0.07	0.11
with 1 tsp margarine	1 sl	—	153	3.4	1.6	3.8	4.3	129.5	15	2.25	5.44	4.42	0.90	0.07	0.05
Griddle cake (made with hydrogenated vegetable shortening)	2 cakes	75	294	3.5	4.3	3.6	7.2	91.0	41	3.03	7.25	6.22	0.91	0.08	0.04
Waffle (made with hydrogenated vegetable shortening)	1 serving	75	246	3.7	2.9	3.7	9.4	128.3	25	3.31	9.05	7.86	1.05	0.09	0.05
Sweet roll (made with lard)	1	54	186	0.9	3.9	5.4	0.4	37.5	28	2.00	3.47	2.55	0.84	0.05	0.03
Dairy Products															
Cheese															
Cheddar	1 cu in	28.35	113	7.1	—	9.1	—	31.5	1	5.38	3.27	3.05	0.13	0.07	0.02
cottage, skim	1 Tbsp rounded	28.35	27	5.5	—	0.1	—	0.3	1	—	—	—	—	—	—
cream	2 Tbsp.	28.35	106	2.6	—	10.5	—	36.3	1	6.04	3.94	3.42	0.36	0.01	0.15
Cream															
light, 20%	2 Tbsp	30	61	0.9	—	6.0	—	20.8	1	3.45	2.25	1.94	0.21	0.01	0.09
heavy, whipped, and sweetened	1 Tbsp heaping	16	52	0.3	—	5.2	—	18.0	1	2.99	1.95	1.69	0.18	0.01	0.07
Milk															
non-fat (skim)	1 c	246	87	8.6	—	0.2	—	0.7	13	0.11	0.08	0.07	0.01	—	—
whole	1 c	244	166	8.5	—	9.5	—	32.9	12	5.24	3.79	3.20	0.55	—	0.04
Yogurt (from whole milk)	1 Tbsp	14	13	0.9	—	0.5	—	1.7	1	0.28	0.20	0.17	0.03	—	—

* Fat, fatty acid, and cholesterol content of foods from O B Hayes and G. Rose, J. Am. Dietet A., 33:27–28, 1957. In all columns, — indicates no value, (—) indicates figure not available for calculating value

TABLE 42—*Continued*

Food	Serving: Amount	Serving: Weight (Gm)	Calories	Protein: Animal (Gm)	Protein: Vegetable (Gm)	Fat: Animal (Gm)	Fat: Vegetable (Gm)	Fat: Cholesterol (Mg)	Carbohydrate (Gm)	Fatty Acids: Total saturated (Gm)	Fatty Acids: Total unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)
Desserts															
Cake, white															
plain (made with hydrogenated vegetable shortening)	1 pc	65	227	1.4	1.3	2.4	7.1	44.6	36	2.02	6.10	5.40	0.56	0.03	0.02
If sugar frosted, add	—	25	63	—	—	—	—	—	17	—	—	—	—	—	—
Cake, fudge†															
plain (made with hydrogenated vegetable shortening)	1 pc	75	281	1.6	1.0	2.6	9.9	56.7	43	2.40	7.71	6.03	0.70	0.05	0.03
If fudge frosted, add	—	30	93	0.5	0.1	1.9	0.4	6.6	19	1.07	0.72	0.62	0.08	—	0.02
Cookies, sugar (made with butter)	1	18	56	0.3	0.5	2.1	0.1	10.8	8	1.17	0.90	0.72	0.14	0.01	0.03
Custard, baked	½ c	126	141	5.9	—	6.0	—	151.7	16	2.76	2.05	1.12	0.70	0.06	0.07
Ice cream, vanilla‡	½ c	71	147	2.8	—	8.9	—	30.8	15	4.91	3.55	2.00	0.52	—	0.04
Pie															
cream (filling made with butter, crust with hydrogenated vegetable shortening)	⅙ of 8 in pie	160	330	3.8	0.7	6.9	2.3	130.9	47	3.85	5.02	4.00	0.78	0.06	0.08
fruit (filling made with butter, crust with hydrogenated vegetable shortening) ..	⅙ of 8 in pie	160	401	—	1.9	3.8	14.6	13.3	60	4.95	12.33	11.42	0.84	0.03	0.05
Fats															
Butter	1 tsp	5	36	—	—	4.1	—	14.2	—	2.36	1.54	1.34	0.12	—	0.06
Bacon, cooked	2 sl	16	97	4.0	—	8.8	—	16.0	—	2.03	5.43	4.60	0.76	0.04	0.01
Bacon, fat	1 Tbsp	14	126	—	—	14.0	—	25.5	—	4.67	8.63	7.30	1.21	0.07	0.05
Salad dressing, cooked	1 Tbsp	14	22	0.4	0.1	1.0	—	24.5	3	0.49	0.40	0.35	0.11	0.01	0.02
Hydrogenated vegetable shortening	1 Tbsp	12.5	110	—	—	—	12.5	—	—	2.40	9.49	8.01	0.56	0.01	—
Margarine	1 tsp	5	36	—	—	—	4.1	—	—	0.74	3.25	2.90	0.35	—	—
Mayonnaise (made with cottonseed oil)	1 Tbsp	14	91	0.1	—	0.1	10.1	7.8	—	2.64	7.22	1.84	5.28	—	—
Olives, ripe	5 large or 10 small	32.5	35	—	0.5	—	3.5	—	1.0	0.52	2.84	2.31	0.33	—	—

† Fatty acid values for cocoa were not available and therefore are not included in the fatty acid figures given

‡ Fatty acid values calculated from butter fat figures

TABLE 42—*Continued*

Food	Serving: Amount	Serving: Weight (Gm)	Calories	Protein: Animal (Gm)	Protein: Vegetable (Gm)	Fat: Animal (Gm)	Fat: Vegetable (Gm)	Fat: Cholesterol (Mg)	Carbohydrate (Gm)	Fatty Acids: Total saturated (Gm)	Fatty Acids: Total unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)
Fats—*Continued*															
Vegetable oils															
coconut	1 Tbsp	14	124	—	—	—	14 0	—	—	12 17	1 13	0 80	0 33	—	—
corn	1 Tbsp	14	124	—	—	—	14 0	—	—	1 50	12 08	4 20	7.88	—	—
cottonseed	1 Tbsp	14	124	—	—	—	14 0	—	—	3 59	9 71	2 46	7 25	—	—
olive	1 Tbsp	14	124	—	—	—	14 0	—	—	2 06	11 37	10 04	1 33	—	—
peanut	1 Tbsp	14	124	—	—	—	14 0	—	—	2 66	10 64	7 00	3 64	—	—
soybean	1 Tbsp	14	124	—	—	—	14 0	—	—	1 67	11 63	4 53	7 10	0 61	—
safflower	1 Tbsp	14	124	—	—	—	14 0	—	—	0 84	13 16	3 70	9 42	0 03	—
vegetable oils (av corn, cottonseed, olive oils)	1 Tbsp	14	124	—	—	—	14 0	—	—	2 38	11 05	5 57	5 49	—	—
White sauce, medium															
made with butter	½ c	66	112	2 2	0 6	8 1	0 1	28 1	7	4.62	3 15	2 69	0 36	0 01	0 09
made with margarine	½ c	66	112	2 2	0 6	2 4	5 8	8 2	7	2 37	5 40	4 86	0 52	0 01	0 01
Fish															
Cod	1 serving	120	89	19 8	—	0 5	—	60 0	—	0 14	0 34	(—)	(—)	(—)	(—)
Flounder	1 serving	120	82	17 9	—	0 6	—	72 0	—	(—)	—	(—)	(—)	(—)	(—)
Frog	2–3 large legs	100	73	16 4	—	0 3	—	40 0	—	0 05	0 23	(—)	(—)	(—)	(—)
Haddock	1 serving	120	95	21 8	—	0 1	—	76 8	—	(—)	—	(—)	(—)	(—)	(—)
Halibut	1 serving	120	151	22 3	—	6 2	—	72 0	—	1 15	4.74	(—)	(—)	(—)	(—)
Lobster, canned	½ c	50	46	9 2	—	0 7	—	104 0	—	(—)	(—)	(—)	(—)	(—)	(—)
Mackerel, Atlantic	1 serving	120	226	22 4	—	14 4	—	96 0	—	3 60	10 08	(—)	(—)	(—)	(—)
Oysters§	1 c (13–19 medium oysters)	240	200	23 5	—	5 0	—	784 0	13	(—)	(—)	(—)	(—)	(—)	(—)
Salmon, Pacific	1 serving	120	268	20 9	—	19 8	—	72 0	—	5 96	12 85	6 27	2 16	—	4 42
Sardines, Atlantic (drained solids)	1 piece 3×1¼×1 in.	50	107	12 9	—	5 5	—	35 0	1	1 78	3 45	1 52	0 78	—	1.15
Shrimp, canned, dry pack	4–6 shrimp	50	64	13 4	—	0 7	—	75 0	—	(—)	(—)	(—)	(—)	(—)	(—)
Tuna, canned, drained solids	½ c	50	99	14 5	—	4 1	—	30 0	—	(—)	(—)	(—)	(—)	(—)	(—)

§ Cholesterol value includes total digitonin-precipitable sterols.

Food	Serving: Amount	Serving: Weight (Gm)	Calories	Protein: Animal (Gm)	Protein: Vegetable (Gm)	Fat: Animal (Gm)	Fat: Vegetable (Gm)	Cholesterol (Mg)	Carbohydrate (Gm)	Fatty Acids: Total saturated (Gm)	Fatty Acids: Total unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Linoleic (Gm)	Linolenic (Gm)	Arachidonic (Gm)
Italian Dishes															
Lasagne imbottite (made with olive oil)	1 c	240	378	10.4	4.0	21.5	3.4	87.4	24	11.86	11.69	10.18	1.22	0.10	0.19
Meatballs, including olive oil for frying	1 meatball 1¾ in diam	25	94	5.2	0.2	3.4	3.8	68.9	2	1.87	5.01	4.37	0.38	0.04	0.02
Meat sauce (made with olive oil)	½ c	105	140	5.5	1.2	3.1	7.2	28.5	5	2.27	7.42	6.68	0.71	0.02	0.02
for grated cheese topping, add	1 Tbsp	7	28	2.6	—	1.9	—	6.6	—	1.22	0.68	0.64	0.03	0.01	—
Pizza, cheese, and tomato (made with olive oil)	1 piece, 5×6 in	227	695	5.1	16.4	3.7	10.4	12.8	90	4.99	16.52	14.09	2.29	0.13	0.01
Ravioli (not including sauce)	1 c	202	276	0.1	5.2	8.3	0.6	177.5	34	2.27	7.42	6.68	0.71	0.02	0.02
Meat and Poultry‡															
Beef round															
medium fat	1 serving	120	218	23.4	—	13.2	—	150.0	—	5.22	7.32	7.03	0.20	0.06	0.03
porterhouse, medium fat	1 serving	120	355	19.7	—	30.0	—	150.0	—	11.87	16.63	15.97	0.45	0.14	0.07
sirloin, medium fat	1 serving	120	305	20.8	—	24.0	—	150.0	—	9.50	13.30	12.77	0.36	0.11	0.06
Brains, all kinds#	1 serving	90	106	8.8	—	7.3	—	2011.5	1	(—)	(—)	—	(—)	(—)	(—)
Chicken fryer															
breast (without bone)	1 serving	120	135	28.0	—	0.6	—	108.0	—	0.18	0.39	0.19	0.18	0.01	0.01
leg (without bone)	1 serving	120	134	24.6	—	3.2	—	72.0	—	0.98	2.06	2.01	0.05	0.05	0.05
Duck, domestic	1 serving	120	392	19.2	—	34.3	—	84.0	—	(—)	(—)	(—)	(—)	(—)	(—)
Frankfurter	1 serving	51	124	7.0	—	10.0	—	(—)	1	3.62	5.04	5.14	0.73	0.04	0.03
Ham	1 serving	120	413	18.2	—	37.2	—	(—)	—	12.94	23.40	9.08	2.56	0.17	0.13
Lamb															
leg	1 serving	120	281	21.6	—	21.0	—	84.0	—	10.55	9.40	8.84	0.32	0.17	0.07
rib chop	1 serving	120	477	17.9	—	38.9	—	84.0	—	19.55	17.41	16.36	0.60	0.31	0.14
Liver															
beef	1 serving	120	163	23.6	—	3.8	—	384.0	7	1.04	2.57	1.64	0.45	—	0.48
calf	1 serving	120	169	22.8	—	5.9	—	432.0	5	(—)	(—)	(—)	(—)	(—)	(—)
Luncheon meat	1 sl	30	81	4.6	—	6.8	—	(—)	1	2.40	4.10	3.59	0.47	0.01	0.03
Pork, loin or chops (without bone)	1 serving	120	355	19.7	—	30.0	—	72.0	—	11.00	17.50	15.10	2.14	0.19	0.07
Rabbit, wild	1 serving	120	149	25.7	—	4.1	—	96.0	—	1.94	2.14	—	(—)	(—)	(—)
Sweetbreads	½ pair	120	221	18.2	—	15.8	—	336.0	—	(—)	(—)	(—)	(—)	(—)	(—)
Tripe, beef	1 piece, 5×2½ in	85	84	16.2	—	1.7	—	128.0	—	(—)	(—)	—	(—)	(—)	(—)
Veal, leg	1 serving	120	228	22.9	—	14.4	—	168.0	—	(—)	(—)	(—)	(—)	(—)	(—)

‡ All portions refer to raw, edible portions unless otherwise stated.

Cholesterol value is for beef brain only.

TABLE 42—*Continued*

Food	Serving: Amount	Serving: Weight (Gm)	Calories	Protein: Animal (Gm)	Protein: Vegetable (Gm)	Fat: Animal (Gm)	Fat: Vegetable (Gm)	Fat: Cholesterol (Mg)	Carbohydrate (Gm)	Fatty Acids: Total saturated (Gm)	Fatty Acids: Total unsaturated (Gm)	Unsaturated Fatty Acids: Oleic (Gm)	Unsaturated Fatty Acids: Linoleic (Gm)	Unsaturated Fatty Acids: Linolenic (Gm)	Unsaturated Fatty Acids: Arachidonic (Gm)
Nuts															
Almonds	12–15 nuts	15	90	—	2.8	—	8.1	—	3	0.23	7.46	5.92	1.54	—	—
Peanuts, roasted	15–17 nuts	15	84	—	4.0	—	6.6	—	4	1.25	5.02	3.30	1.72	—	—
Pistachio nuts	30 nuts	15	88	—	2.9	—	8.0	—	3	1.09	6.51	4.95	1.56	—	—
Walnuts, English	8–15 halves	15	98	—	2.3	—	9.7	—	2	0.60	8.63	2.43	6.20	—	—
Miscellaneous Foods															
Avocado	½ small pair	100	245	—	1.7	—	26.4	—	5	5.11	19.98	16.69	3.29	—	—
Egg	1 medium	54	77	6.1	—	5.5	—	340.0	—	1.64	3.58	2.10	1.19	0.16	0.13
Wheat germ	1 Tbsp., rounded	10	36	—	2.5	—	1.0	—	5	0.10	0.86	0.57	0.29	—	—

APPENDIX 6

Amino Acid Content of Foods

The following table is taken from a compilation prepared by M. L. Orr and B. K. Watt, as Home Economics Research Report No. 4 (1957), Household Economics Research Division, Institute of Home Economics, Agricultural Research Service, U.S. Department of Agriculture. The original report contains data on 18 amino acids in 202 food items Only the average amounts of 8 "essential" amino acids, plus arginine and histidine, have been included in the following table. This table is useful when an average protein content may be assumed. When specific nitrogen or protein content of a food is known, reference may be made to the original publication.

TABLE 43

Amino Acid Content of Foods, 100 Gm., Edible Portion

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
Milk; Milk Products												
Milk (Protein, N×6.38):												
cow:												
fluid, whole and non-fat (3.5% protein)												
canned												
evaporated, unsweetened (7.0% protein)	0.049	0.161	0.223	0.344	0.272	0.086	0.031	0.170	0.178	0.240	0.128	0.092
condensed, sweetened (8.1% protein)	0.099	0.323	0.447	0.688	0.545	0.171	0.063	0.340	0.357	0.481	0.256	0.185
dried:	0.114	0.374	0.518	0.796	0.631	0.198	0.072	0.393	0.413	0.557	0.296	0.214
whole (25.8% protein)	0.364	1.191	1.648	2.535	2.009	0.632	0.231	1.251	1.316	1.774	0.944	0.680
non-fat (35.6% protein)	0.502	1.641	2.271	3.493	2.768	0.870	0.318	1.724	1.814	2.444	1.300	0.937
goat (3.3% protein)	0.039	0.217	0.087	0.278	0.312	0.065	.....	0.121	.....	0.139	0.174	0.068
human (1.4% protein)	0.023	0.062	0.075	0.124	0.090	0.028	0.027	0.060	0.071	0.086	0.055	0.030
Indian buffalo (4.2% protein)	0.059	0.212	0.204	0.420	0.331	0.112	0.058	0.177	.....	0.255	0.136	0.086
Milk products:												
buttermilk (3.5% protein, N×6.38)	0.038	0.165	0.219	0.348	0.291	0.082	0.032	0.186	0.137	0.262	0.168	0.099
casein (100.0% protein, N×6.29)	1.335	4.277	6.550	10.048	8.013	3.084	0.382	5.389	5.819	7.393	4.070	3.021
cheese (protein, N×6.38):												
blue mold (21.5% protein)	0.293	0.799	1.449	2.096	1.577	0.559	0.121	1.153	1.028	1.543	0.785	0.701
Camembert (17.5% protein)	0.239	0.650	1.179	1.706	1.284	0.455	0.099	0.938	0.837	1.256	0.639	0.571
Cheddar (25.0% protein)	0.341	0.929	1.685	2.437	1.834	0.650	0.141	1.340	1.195	1.794	0.913	0.815
Cheddar processed (23.2% protein)	0.316	0.862	1.563	2.262	1.702	0.604	0.131	1.244	1.109	1.665	0.847	0.756
cheese foods, Cheddar (20.5% protein)	0.280	0.761	1.382	1.908	1.504	0.533	0.116	1.099	0.980	1.472	0.749	0.668
cottage (17.0% protein)	0.179	0.794	0.08[illegible]		1.428	0.469	0.147	0.917	0.917	0.978	0.802	0.549

TABLE 43—*Continued*

Protein Content, and *Nitrogen Conversion Factor*	Trypto-phan (Gm.)	Threo-nine (Gm.)	Iso-leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi-onine (Gm.)	Cystine (Gm.)	Phenyl-alanine (Gm.)	Tyro-sine (Gm.)	Valine (Gm.)	Argi-nine (Gm.)	Histi-dine (Gm.)
MILK PRODUCTS—*Continued*												
cream cheese (9.0% protein)	0.080	0.408	0.519	0.923	0.721	0.229	0.085	0.547	0.408	0.538	0.313	0.278
Limburger (21.2% protein)	0.289	0.788	1.429	2.067	1.555	0.552	0.120	1.136	1.014	1.522	0.774	0.691
Parmesan (36.0% protein)	0.491	1.337	2.426	3.510	2.641	0.937	0.203	1.930	1.721	2.584	1.315	1.174
Swiss (27.5% protein)	0.375	1.021	1.853	2.681	2.017	0.715	0.155	1.474	1.315	1.974	1.004	0.896
Swiss processed (26.4% protein)	0.360	0.981	1.779	2.574	1.937	0.687	0.149	1.415	1.262	1.895	0.964	0.861
lactalbumin (100.0% protein, N×6.49)	2.203	5.239	6.209	12.342	9.060	2.250	3.405	4.360	3.806	5.686	3.498	1.911
whey (Protein, N×6.49)												
fluid (0.9% protein)	0.010	0.048	0.052	0.074	0.055	0.013	0.018	0.023	0.009	0.045	0.017	0.011
dried (12.7% protein)	0.147	0.677	0.734	1.043	0.769	0.188	0.250	0.323	0.131	0.640	0.235	0.159
EGGS, CHICKEN (Protein, N×6.25)												
Fresh or stored												
whole (12.8% protein)	0.211	0.637	0.850	1.126	0.819	0.401	0.299	0.739	0.551	0.950	0.840	0.307
whites (10.8% protein)	0.164	0.477	0.698	0.950	0.648	0.420	0.263	0.689	0.449	0.842	0.634	0.233
yolks (16.3% protein)	0.235	0.837	0.996	1.372	1.074	0.417	0.274	0.717	0.756	1.121	1.132	0.368
Dried												
whole (46.8% protein)	0.771	2.329	3.108	4.118	2.995	1.468	1.093	2.703	2.014	3.474	3.070	1.123
whites (85.9% protein)	1.306	3.793	5.553	7.559	5.154	3.340	2.089	5.484	3.573	6.693	5.044	1.855
yolks (31.2% protein)	0.449	1.582	1.907	2.626	2.057	0.799	0.524	1.373	1.448	2.147	2.167	0.704
MEAT, POULTRY, FISH AND SHELLFISH; THEIR PRODUCTS												
Meat (Protein, N×6.25).												
beef carcass or side.												
thin (18.8% protein)	0.220	0.830	0.984	1.540	1.642	0.466	0.238	0.773	0.638	1.044	1.212	0.653
medium fat (17.5% protein)	0.204	0.773	0.916	1.434	1.529	0.434	0.221	0.720	0.594	0.972	1.128	0.608
fat (16.3% protein)	0.190	0.720	0.853	1.335	1.424	0.404	0.206	0.670	0.553	0.905	1.051	0.566
very fat (13.7% protein)	0.160	0.605	0.717	1.122	1.197	0.340	0.173	0.563	0.465	0.761	0.883	0.476
medium fat, trimmed to retail basis (18.2% protein)	0.213	0.804	0.952	1.491	1.590	0.451	0.230	0.748	0.617	1.010	1.174	0.632

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
MEAT; POULTRY; FISH—*Continued*												
beef cuts, medium fat:												
chuck (18.6% protein)	0.217	0.821	0.973	1.524	1.625	0.461	0.235	0.765	0.631	1.033	1.199	0.646
flank (19.9% protein)	0.232	0.879	1.041	1.630	1.738	0.494	0.252	0.818	0.675	1.105	1.283	0.691
hamburger (16.0% protein)	0.187	0.707	0.837	1.311	1.398	0.397	0.202	0.658	0.543	0.888	1.032	0.556
porterhouse (16.4% protein)	0.192	0.724	0.858	1.343	1.433	0.407	0.207	0.674	0.556	0.911	1.057	0.569
rib roast (17.4% protein)	0.203	0.768	0.910	1.425	1.520	0.432	0.220	0.715	0.590	0.966	1.122	0.604
round (19.5% protein)	0.228	0.861	1.020	1.597	1.704	0.484	0.246	0.802	0.661	1.083	1.257	0.677
rump (16.2% protein)	0.189	0.715	0.848	1.327	1.415	0.402	0.205	0.666	0.550	0.899	1.045	0.562
sirloin (17.3% protein)	0.202	0.764	0.905	1.417	1.511	0.429	0.219	0.711	0.587	0.960	1.116	0.601
beef, canned (25.0% protein)	0.292	1.104	1.308	2.048	2.184	0.620	0.316	1.028	0.848	1.388	1.612	0.868
beef, dried or chipped (34.3% protein)	0.401	1.515	1.795	2.810	2.996	0.851	0.434	1.410	1.163	1.904	2.212	1.191
lamb carcass or side:												
thin (17.1% protein)	0.222	0.782	0.886	1.324	1.384	0.410	0.224	0.695	0.594	0.843	1.114	0.476
medium fat (15.7% protein)	0.203	0.718	0.814	1.216	1.271	0.377	0.206	0.638	0.545	0.774	1.022	0.437
fat (13.0% protein)	0.168	0.595	0.674	1.007	1.052	0.312	0.171	0.528	0.451	0.641	0.847	0.362
lamb cuts, medium fat:												
leg (18.0% protein)	0.233	0.824	0.933	1.394	1.457	0.432	0.236	0.732	0.625	0.887	1.172	0.501
rib (14.9% protein)	0.193	0.682	0.772	1.154	1.206	0.358	0.195	0.606	0.517	0.734	0.970	0.415
shoulder (15.6% protein)	0.202	0.714	0.809	1.208	1.263	0.374	0.205	0.634	0.542	0.769	1.016	0.434
pork, packer's carcass or side												
thin (14.1% protein)	0.183	0.654	0.724	1.038	1.157	0.352	0.165	0.555	0.503	0.733	0.864	0.487
medium fat (11.9% protein)	0.154	0.552	0.611	0.876	0.977	0.297	0.139	0.468	0.425	0.619	0.729	0.411
fat (9.8% protein)	0.127	0.455	0.503	0.721	0.804	0.245	0.114	0.386	0.350	0.510	0.601	0.339
pork cuts, medium fat, fresh:												
ham (15.2% protein)	0.197	0.705	0.781	1.119	1.248	0.379	0.178	0.598	0.542	0.790	0.931	0.525
loin (16.4% protein)	0.213	0.761	0.842	1.207	1.346	0.409	0.192	0.646	0.585	0.853	1.005	0.567
miscellaneous lean cuts (14.5% protein)	0.188	0.673	0.745	1.067	1.190	0.362	0.169	0.571	0.517	0.754	0.889	0.501

TABLE 43—*Continued*

Protein Content, and *Nitrogen Conversion Factor*	Trypto-phan (Gm.)	Threo-nine (Gm.)	Iso-leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi-onine (Gm.)	Cystine (Gm.)	Phenyl-alanine (Gm.)	Tyro-sine (Gm.)	Valine (Gm.)	Argi-nine (Gm.)	Histi-dine (Gm.)
MEAT; POULTRY; FISH—*Continued*												
pork, cured												
bacon, medium fat (9.1% protein)	0.095	0.306	0.399	0.728	0.587	0.141	0.106	0.434	0.234	0.434	0.622	0.246
fat back or salt pork (3.9% protein)	0.006	0.141	0.110	0.367	0.317	0.055	0.043	0.157	0.052	0.168	0.379	0.035
ham (16.9% protein)	0.162	0.692	0.841	1.306	1.420	0.411	0.273	0.646	0.652	0.879	1.068	0.544
luncheon meat												
boiled ham (22.8% protein)	0.219	0.934	1.135	1.762	1.915	0.554	0.368	0.872	0.879	1.186	1.441	0.733
canned, spiced (14.9% protein)	0.143	0.610	0.741	1.151	1.252	0.362	0.241	0.570	0.575	0.775	0.942	0.479
rabbit, domesticated, flesh only (21.0% protein)		1.021	1.082	1.636	1.818	0.541	.	0.793	..	1.021	1.176	0.474
veal, carcass or side												
thin (19.7% protein)	0.258	0.854	1.040	1.444	1.645	0.451	0.233	0.801	0.709	1.018	1.283	0.634
medium fat (19.1% protein)	0.251	0.828	1.008	1.400	1.595	0.437	0.226	0.776	0.688	0.987	1.244	0.614
fat (18.5% protein)	0.243	0.802	0.977	1.356	1.545	0.423	0.219	0.752	0.666	0.956	1.205	0.595
veal cuts, medium fat												
round (19.5% protein)	0.256	0.846	1.030	1.429	1.629	0.446	0.231	0.792	0.702	1.008	1.270	0.627
shoulder (19.4% protein)	0.255	0.841	1.024	1.422	1.620	0.444	0.230	0.788	0.698	1.003	1.263	0.624
stew meat (18.3% protein)	0.240	0.793	0.966	1.341	1.528	0.419	0.217	0.744	0.659	0.946	1.192	0.589
Poultry (Protein, N×6.25)												
chicken, flesh only												
broilers or fryers (20.6% protein)	0.250	0.877	1.088	1.490	1.810	0.537	0.277	0.811	0.725	1.012	1.302	0.593
hens (21.3% protein)	0.259	0.907	1.125	1.540	1.871	0.556	0.286	0.838	0.750	1.046	1.346	0.613
ducks, domesticated, flesh only (21.4% protein)	..	0.935	1.109	1.657	1.842	0.531	....	0.842	.....	1.027	1.301	0.486
turkey, flesh only (24.0% protein)	..	1.014	1.260	1.836	2.173	0.664	0.330	0.960	....	1.187	1.513	0.649

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
MEAT; POULTRY; FISH—*Continued*												
sausage:												
Bologna (14.8% protein)	0.126	0.606	0.718	1.061	1.191	0.313	0.185	0.540	0.481	0.744	1.028	0.398
Braunschweiger (15.4% protein)	0.172	0.668	0.754	1.291	1.200	0.320	0.187	0.700	0.471	0.956	0.954	0.458
frankfurters (14.2% protein)	0.120	0.582	0.688	1.018	1.143	0.300	0.177	0.518	0.461	0.713	0.986	0.382
head cheese (15.0% protein)	0.079	0.418	0.509	0.946	0.907	0.250	0.209	0.569	0.569	0.617	1.075	0.278
liverwurst (16.7% protein)	0.187	0.724	0.818	1.400	1.301	0.347	0.203	0.759	0.510	1.037	1.034	0.497
pork, links or bulk, raw (10.8% protein)	0.092	0.442	0.524	0.774	0.869	0.228	0.135	0.394	0.351	0.543	0.750	0.290
pork, bulk, canned (15.4% protein)	0.131	0.631	0.747	1.104	1.239	0.325	0.192	0.562	0.500	0.774	1.069	0.414
salami (23.9% protein)	0.203	0.979	1.159	1.713	1.923	0.505	0.298	0.872	0.776	1.201	1.660	0.642
Vienna sausage, canned (15.8% protein)	0.134	0.647	0.766	1.133	1.272	0.334	0.197	0.576	0.513	0.794	1.097	0.425
tongue:												
beef (16.4% protein)	0.197	0.708	0.792	1.286	1.364	0.357	0.207	0.661	0.548	0.840	1.065	0.412
pork (16.8% protein)	0.202	0.726	0.812	1.317	1.398	0.366	0.212	0.677	0.562	0.860	1.091	0.422
veal and pork loaf, canned (17.2% protein)	0.198	0.627	0.859	1.236	1.258	0.418	0.209	0.619	0.468	0.958	0.916	0.388
LEGUMES (DRY SEED); COMMON NUTS; OTHER NUTS AND DRY SEEDS; THEIR PRODUCTS:												
Legume seeds and their products:												
beans (*Phaseolus vulgaris*) (N× 6.25):												
pinto and red Mexican (23.0% protein)	0.213	0.997	1.306	1.976	1.708	0.232	0.228	1.270	0.887	1.395	1.384	0.655
red kidney:												
raw (23.1% protein)	0.214	1.002	1.312	1.985	1.715	0.233	0.229	1.275	0.891	1.401	1.390	0.658
canned, solids and liquid (5.7% protein)	0.053	0.247	0.324	0.490	0.423	0.057	0.057	0.315	0.220	0.346	0.343	[illegible]

TABLE 43—*Continued*

Protein Content, and *Nitrogen Conversion Factor*	Trypto-phan (Gm.)	Threo-nine (Gm.)	Iso-leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi-onine (Gm.)	Cystine (Gm.)	Phenyl-alanine (Gm.)	Tyro-sine (Gm.)	Valine (Gm.)	Argi-nine (Gm.)	Histi-dine (Gm.)
LEGUMES, SEEDS; NUTS—*Continued*												
other common beans including navy, peabean, white marrow												
raw (21.4% protein)	0.199	0.928	1.216	1.839	1.589	0.216	0.212	1.181	0.825	1.298	1.287	0.609
baked with pork, canned (5.8% protein)	0.057	0.274	0.291	0.486	0.354	0.059	0.018	0.333	0.165	0.312	0.251	0.186
black gram, raw (23.6% protein, N×6.25)	0.242	0.801	1.390	2.062	1.510	0.332	0.287	1.242	0.551	1.450	1.552	0.559
broadbeans, raw (25.4% protein, N×6.25)	0.236	0.829	1.593	2.211	1.426	0.106	0.179	1.057	0.687	1.276	1.780	0.748
chickpeas (20.8% protein, N±6.25)	0.170	0.739	1.195	1.538	1.434	0.276	0.296	1.012	0.692	1.025	1.551	0.559
cowpeas (22.9% protein, N×6.25	0.220	0.901	1.110	1.715	1.491	0.352	0.297	1.198	0.678	1.293	1.473	0.692
dolichos, twinflower (21.6% protein, N×6.25)	0.221	0.836	1.448	1.707	1.700	0.294	0.480	1.486	0.560	1.236	1.230	0.650
lentils, whole (25.0% protein, N×6.25)	0.216	0.896	1.316	1.760	1.528	0.180	0.204	1.104	0.664	1.360	1.908	0.548
lima beans (20.7% protein, N×6.25	0.195	0.980	1.199	1.722	1.378	0.331	0.311	1.222	0.543	1.298	1.315	0.669
lupine (32.3% protein, N×6.25)		1.101	1.618	1.964	1.447	0.114		1.271	...	1.328	2.718	0.811
moth beans (24.4% protein, N×6.25)	0.164		1.093	1.484	1.202	0.191	0.109	1.003	1.245	0.695	......	0.722
mung beans (24.4% protein, 6.25)	0.180	0.765	1.351	2.202	1.667	0.265	0.152	1.167	0.390	1.444	1.370	0.543
peanuts (26.9% protein, N×5.46)	0.340	0.828	1.266	1.872	1.099	0.271	0.463	1.557	1.104	1.532	3.296	0.749
peanut flour (51.2% protein, N×5.46)	0.647	1.575	2.410	3.563	2.091	0.516	0.881	2.963	2.100	2.916	6.273	1.425
peanut butter (26.1% protein, N×5.46)	0.330	0.803	1.228	1.816	1.066	0.263	0.449	1.510	1.071	1.487	3.198	0.727

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
LEGUMES; SEEDS; NUTS—*Continued*												
peas (*Pisum sativum*) (N×6.25):												
entire seeds (23.8% protein)	0.251	0.918	1.340	1.969	1.744	0.286	0.308	1.200	0.960	1.333	2.102	0.651
split (24.5% protein)	0.259	0.945	1.380	2.027	1.795	0.294	0.318	1.235	0.988	1.372	2.164	0.670
pigeonpeas, without seed coat (21.9% protein, N×6.25)	0.119	0.834	1.346	1.717	1.580	0.256	0.308	1.875	0.725	1.153	1.489	0.617
soybeans, whole (34.9% protein, N×5.71)	0.526	1.504	2.054	2.946	2.414	0.513	0.678	1.889	1.216	2.005	2.763	0.911
soybean flour, flakes, and grits (protein, N×5.71)												
low fat (44.7% protein)	0.673	1.926	2.630	3.773	3.092	0.658	0.869	2.419	1.558	2.568	3.538	1.166
medium fat (42.5% protein)	0.640	1.831	2.501	3.588	2.940	0.625	0.826	2.300	1.481	2.441	3.364	1.109
full fat (35.9% protein)	0.541	1.547	2.112	3.030	2.483	0.528	0.698	1.943	1.251	2.062	2.842	0.937
soybean curd (7.0% protein, N×5.71)	...	...	...	...	...	0.081	0.091	...	...	...	...	...
soybean milk (3.4% protein, N×5.71)	0.051	0.176	0.175	0.305	0.269	0.054	0.071	0.195	0.193	0.186	0.302	0.121
vetch (28.8% protein, N×6.25)	0.203	0.899	2.198	2.290	1.898	0.346	0.336	1.014	0.369	1.442	2.249	0.659
Common nuts and their products:												
almonds (18.6 protein, N×5.18)	0.176	0.610	0.873	1.454	0.582	0.259	0.377	1.146	0.618	1.124	2.729	0.517
Brazil nuts (14.4% protein, N×5.46)	0.187	0.422	0.593	1.129	0.443	0.941	0.504	0.617	0.483	0.823	2.247	0.367
cashews (18.5% protein, N×5.30)	0.471	0.737	1.222	1.522	0.792	0.353	0.527	0.946	0.712	1.592	2.098	0.415
coconut (3.4% protein, N×5.30)	0.033	0.129	0.180	0.269	0.152	0.071	0.062	0.174	0.101	0.212	0.486	0.069
coconut meal (20.3% protein, N×5.30)	0.199	0.770	1.076	1.605	0.908	0.421	0.372	1.038	0.605	1.268	2.899	0.414
filberts (12.7% protein, N×5.30)	0.211	0.415	0.853	0.939	0.417	0.139	0.165	0.537	0.434	0.934	2.171	0.288
peanuts. *See* Legumes.												
pecans (9.4% protein, N×5.30)	0.138	0.389	0.553	0.773	0.435	0.153	0.216	0.564	0.316	0.525	1.185	0.273
walnuts (English or Persian) (15.0% protein, N×5.30)	0.175	0.589	0.767	1.228	0.441	0.306	0.320	0.767	0.583	0.974	2.287	0.405

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Trypto-phan (Gm.)	Threo-nine (Gm.)	Iso-leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi-onine (Gm.)	Cystine (Gm.)	Phenyl-alanine (Gm.)	Tyro-sine (Gm.)	Valine (Gm.)	Argi-nine (Gm.)	Histi-dine (Gm.)
LEGUMES, SEEDS; NUTS—*Continued*												
Other nuts and seeds and their products												
(*Protein N×5.30*)												
acorns (10.4% protein)	0.126	0.434	0.561	0.808	0.636	0.139	0.184	0.473		0.718	0.722	0.251
amaranth (14.6% protein)	0.149	0.832	0.882	1.209	1.074	0.372	0.521	1.141	.	0.849	1.747	0.441
balsam pear seed meal (41.9% protein)					1.265		0.142	2.609	0.617	.	5.914	0.917
breadnut tree, Ramon (9.6% protein)	0.261	0.373	0.543	1.041	0.418	0.056		0.453		0.927	0.884	0.147
Chinese tallow tree nut flour (57.6% protein)	0.837	2.174	3.510	4.347	1.587	0.924	0.696	2.847	2.011	4.510	10.031	1.587
chocolate tree, Nicaragua (38.5% protein)	0.588	1.496	2.092	3.952	2.223	0.276		2.630	.	2.404	4.220	0.683
cottonseed flour and meal (42.3% protein)	0.591	1.764	1.884	2.945	2.130	0.686	0.814	2.610	1.365	2.458	5.603	1.325
carpod tree, Guanacaste (34.1% protein)	0.444	1.165	2.213	4.581	1.930	0.360		1.325	. .	1.570	2.857	1.004
lead tree (24.1% protein)	0.191	0.828	1.651	1.787	1.164	0.055		0.855	. . . .	0.861	2.410	0.564
pumpkin seed (30.9% protein)	0.560	0.933	1.737	2.437	1.411	0.577		1.749	.	1.679	4.810	0.711
safflower seed meal (42.1% protein)	0.675	1.462	1.914	2.740	1.525	0.731	.	2.605	. .	2.446	4.623	0.985
sesame:												
seed (19.3% protein)	0.331	0.707	0.951	1.679	0.583	0.637	0.405	1.457	0.951	0.885	1.992	0.441
meal (33.4% protein)	0.573	1.223	1.645	2.905	1.008	1.103	0.857	2.521	1.645	1.531	3.447	0.763
sunflower:												
kernel (23.0% protein)	0.343	0.911	1.276	1.736	0.868	0.443	0.464	1.220	0.647	1.354	2.370	0.586
meal (39.5% protein)	0.589	1.565	2.191	2.981	1.491	0.760	0.797	2.094	1.110	2.325	4.069	1.006

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
GRAINS AND THEIR PRODUCTS												
Barley (12.8% protein, N×5.83)	0.160	0.433	0.545	0.889	0.433	0.184	0.257	0.661	0.466	0.643	0.659	0.239
Bread, white (4% non-fat dry milk, flour basis) (8.5% protein, N×5.70)	0.091	0.282	0.429	0.668	0.225	0.142	0.200	0.465	0.243	0.435	0.340	0.192
Buckwheat flour												
dark (11.7% protein, N×6.25)	0.165	0.461	0.440	0.683	0.687	0.206	0.228	0.442	0.240	0.607	0.930	0.256
light (6.4% protein, N×6.25)	0.090	0.252	0.241	0.374	0.376	0.113	0.125	0.242	0.131	0.332	0.509	0.140
Cañihua (14.7% protein, N×6.25)	0.118	0.706	1.000	0.851	0.882	0.263	0.162	0.529	0.294	0.677	1.162	0.367
Cereal combinations												
corn and soy grits (18.0% protein, N×6.25)	0.161	0.792	0.841	1.656	0.772	0.271	0.311	0.832	0.562	1.054	0.982	0.472
infant food, precooked, mixed cereals with non-fat dry milk and yeast (19.4% protein, N×6.25)	0.118		.		0.273	0.310	0.137	0.543	0.447	......	0.447	0.233
oat-corn-rye mixture, puffed (14.5% protein, N×5.83)	0.172	0.545	0.841	1.368	0.343	0.388	0.234	0.933	0.622	0.900	0.776	0.326
Corn, field (10.0% protein, N×6.25)	0.061	0.398	0.462	1.296	0.288	0.186	0.130	0.454	0.611	0.510	0.352	0.206
Corn flour (7.8% protein, N×6.25)	0.047	0.311	0.361	1.011	0.225	0.145	0.101	0.354	0.477	0.398	0.275	0.161
Corn grits (8.7% protein, N×6.25)	0.053	0.347	0.402	1.128	0.251	0.161	0.113	0.395	0.532	0.444	0.306	0.180
Cornmeal												
whole ground (9.2% protein, N×6.25)	0.056	0.367	0.425	1.192	0.265	0.171	0.119	0.418	0.562	0.470	0.324	0.190
de-germed (7.9% protein, N×6.25)	0.048	0.315	0.365	1.024	0.228	0.147	0.102	0.359	0.483	0.403	0.278	0.163
Corn products												
flakes (8.1% protein, N×6.25)	0.052	0.275	0.306	1.047	0.154	0.135	0.152	0.354	0.283	0.386	0.231	0.226
germ (14.5% protein, N×6.25)	0.144	0.622	0.578	1.030	0.791	0.232	0.130	0.483	0.343	0.789	1.134	0.464
gluten (10.0% protein, N×6.25)	0.059	0.344	0.443	1.563	0.179	0.282	0.141	0.558	0.582	0.512	0.322	0.200
hominy (8.7% protein, N×6.25)	0.084	0.316	0.349	0.810	0.358	0.099	...	0.333	0.331	0.398	0.444	0.203
masa (2.8% protein, N×6.25)	0.010	...	...	...	0.103	0.108	0.030	...	...	...	...	...
pozol (5.9% protein, N×6.25)	0.042	0.336	0.304	0.591	0.234	0.087	...	0.254	...	0.267	0.197	0.122
tortilla (5.8% protein, N×6.25)	0.031	0.235	0.345	0.939	0.145	0.111	...	0.252	...	0.304	0.223	0.128
zein (16.1% protein, N×6.25)	0.010	0.495	0.822	3.184	.....	0.281	0.162	1.664	0.981	0.654	0.286	0.216
Job's tears (13.8% protein, N×5.83)	0.066	0.620	1.065	3.506	0.362	0.459	0.265	0.703	..	....	0.518	0.317

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
GRAINS AND PRODUCTS—*Continued*												
Millets:												
foxtail millet (9.7% protein, N×5.83)	0.103	0.323	0.790	1.737	0.218	0.291	...	0.697	...	0.717	0.374	0.218
little millet (7.2% protein, N×5.83)	0.047	0.262	0.517	0.841	0.138	0.178	.	0.370	.....	0.471	0.363	0.147
pearl millet (11.4% protein, N×5.83)	0.248	0.456	0.635	1.746	0.383	0.270	0.152	0.506	...	0.682	0.524	0.240
ragimillet (6.2% protein, N×5.83)	0.085	0.270	0.398	0.620	0.202	0.270	0.187	0.263	.	0.473	0.100	0.079
Oatmeal and rolled oats (14.2% protein, N×5.83)	0.183	0.470	0.733	1.065	0.521	0.209	0.309	0.758	0.524	0.845	0.935	0.261
Quinoa (11.0% protein, N×6.25)	0.120	0.523	0.722	0.781	0.729	0.278	0.107	0.394	0.253	0.447	0.820	0.297
Rice:												
brown (7.5% protein, N×5.95)	0.081	0.294	0.352	0.646	0.296	0.135	0.102	0.377	0.343	0.524	0.432	0.126
white and converted (7.6% protein, N×5.95)	0.082	0.298	0.356	0.655	0.300	0.137	0.103	0.382	0.347	0.531	0.438	0.128
Rice products												
flakes or puffed (5.9% protein, N×5.95)	0.046				0.056		0.044	0.286	0.124	...	0.137	0.137
germ (14.2% protein, N×5.95)	0.270	1.177	0.630	0.838	1.707	0.420	0.169	0.750	0.929	0.938	1.559	0.430
Rye (12.1% protein, N×5.83)	0.137	0.448	0.515	0.813	0.494	0.191	0.241	0.571	0.390	0.631	0.591	0.276
Rye flour												
light (9.4% protein, N×5.83)	0.106	0.348	0.400	0.632	0.384	0.148	0.187	0.443	0.303	0.490	0.459	0.214
medium (11.4% protein, N×5.83)	0.129	0.422	0.485	0.766	0.465	0.180	0.227	0.538	0.368	0.594	0.557	0.260
Sorghum (11.0% protein, N×6.25)	0.123	0.394	0.598	1.767	0.299	0.190	0.183	0.547	0.303	0.628	0.417	0.211
Teosinte (22.0% protein, N×6.25)	0.049				0.348	0.496	.	...	...	....	...	......
Wheat, whole grain												
hard red spring (14.0% protein, N×5.83)	0.173	0.403	0.607	0.939	0.384	0.214	0.307	0.691	0.523	0.648	0.670	0.286
hard red winter (12.3% protein, N×5.83)	0.152	0.354	0.534	0.825	0.338	0.188	0.270	0.608	0.460	0.570	0.589	0.251
soft red winter (10.2% protein, N×5.83)	0.126	0.294	0.443	0.684	0.280	0.156	0.224	0.504	0.382	0.472	0.488	0.208
white (9.4% protein, N×5.83)	0.116	0.271	0.408	0.630	0.258	0.143	0.206	0.464	0.351	0.435	0.450	0.192
durum (12.7% protein, N×5.83)	0.157	0.366	0.551	0.852	0.348	0.194	0.279	0.627	0.475	0.588	0.608	0.259

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm)	Threonine (Gm)	Isoleucine (Gm)	Leucine (Gm)	Lysine (Gm)	Methionine (Gm)	Cystine (Gm)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm)	Histidine (Gm)
GRAINS AND PRODUCTS—*Continued*												
Wheat flour.												
whole grain (13 3% protein, N× 5.83)	0 164	0 383	0 577	0 892	0.365	0.203	0.292	0.657	0.497	0.616	0.636	0.271
intermediate extraction (12 0% protein, N×5 70)	...	0.392	0 619	0 924	0.356	0.198	0.320	0.732	0.335	0.583	0.549	0.286
white (10.5% protein, N×5.70)	0.129	0 302	0.483	0.809	0 239	0.138	0.210	0.577	0.359	0 453	0.466	0.210
Wheat products												
bran (12 0% protein, N×6.31)	0 196	0 342	0 485	0 717	0 491	0 145	0.270	0.434	0 259	0.552	0.742	0.280
burghul (12 4% protein, N×5 83)	0 070	....	....	......	0.430	0.300	0.319	......	......	......	......	......
farina (10 9% protein, N×5 70)	0.124	....	....	......	0 199	0.143	0.184	0.579	0.447	......	0 424	0.268
flakes (10 8% protein, N×5.70)	0 121	0 356	0.496	0 891	0.360	0 127	0.191	0.478	0.311	0 572	0.559	0.231
germ (25.2% protein, N×5.80)	0 265	1.343	1 177	1.708	1.534	0.404	0.287	0.908	0.882	1.364	1.825	0.687
gluten, commercial (80.0% protein, N×5.76)	0 856	2.119	3.677	5.993	1.530	1 389	1.726	4.351	2.596	3.789	3.481	1.825
gluten flour (41 4% protein, N× 5.70)	0 443	1.097	1 903	3.101	0.792	0.719	0.893	2.252	1.344	1.961	1.801	0.944
macaroni or spaghetti (12.8% protein, N×5.70)	0 150	0.499	0 642	0.849	0 413	0.193	0.243	0.669	0.422	0.728	0.582	0.303
noodles, containing egg solids (12 6% protein, N×5.70)	0 133	0 533	0.621	0.834	0.411	0.212	0.245	0.610	0.312	0 745	0 621	0.301
Shredded Wheat (10.1% protein, N×5 83)	0 085	0.405	0 449	0.684	0.331	0.139	0.204	0.481	0.236	0.577	[illegible]	
whole wheat with added germ (12 8% protein, N×5 83)	0.136	......	......	......	0.466	......	0.246	[illegible]				
FRUITS (Protein, N×6 25)												
Abiu (1.7% protein)												
Avocados (1.3% protein)	0 028	......										
Bananas ripe												
common (1.2% protein)	0 014	......										
dwarf (1.2% pro[illegible]												
Dates ([illegible]												

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm)	Threonine (Gm)	Isoleucine (Gm)	Leucine (Gm)	Lysine (Gm)	Methionine (Gm)	Cystine (Gm)	Phenylalanine (Gm)	Tyrosine (Gm)	Valine (Gm)	Arginine (Gm)	Histidine (Gm)
FRUITS—*Continued*												
Grapefruit (0.5% protein)	0.001			.	0.006	0.000	...	...	...	...	...	...
Guavas, common (1.0% protein)	0.010	.			0.030	0.010	.	...	...	...	...	...
Limes (0.8% protein)	0.003				0.015	0.002		.	...	...	...	...
Mamey (0.5% protein)	0.006				0.040	0.007		...	.	...	...	...
Mangos (0.7% protein)	0.014				0.093	0.008			...	...	...	...
Muskmelons (0.6% protein)	0.001				0.015	0.002			.	...	...	...
Oranges, sweet (0.9% protein)	0.003				0.024	0.003				.	...	...
Orange juice (0.8% protein)	0.003				0.021	0.002			...	...	...	...
Oranges, mandarin including tangerines (0.8% protein)	0.005				0.028	0.004				.	...	...
Papayas (0.6% protein)	0.012				0.038	0.002			.	.	...	...
Pineapple (0.4% protein)	0.005				0.009	0.001			...	...	...	...
Plantain or baking banana (1.1% protein)	0.010	0.027	0.056	0.059	0.050	0.005	0.016	0.049		0.065	0.045	...
Soursop (1.0% protein)	0.011				0.060	0.007			.	...	...	...
Sugarapple (1.8% protein)	0.009			.	0.071	0.008			...	...	...	...
VEGETABLES												
Immature seeds (Protein, N×6.25)												
corn, sweet, white or yellow												
raw (3.7% protein)	0.023	0.151	0.137	0.407	0.137	0.072	0.062	0.207	0.124	0.231	0.174	0.095
canned, solids and liquid (2.0% protein)	0.012	0.082	0.074	0.220	0.074	0.039	0.033	0.112	0.067	0.125	0.094	0.052
cowpeas (9.4% protein)	0.099	0.353	0.465	0.653	0.617	0.131	.	0.523	....	0.513	0.615	0.310
lima beans												
raw (7.5% protein)	0.097	0.338	0.460	0.605	0.474	0.080	0.083	0.389	0.259	0.485	0.454	0.247
canned, solids and liquid (3.8% protein)	0.049	0.171	0.233	0.306	0.240	0.041	0.042	0.197	0.131	0.246	0.230	0.125
peas,												
raw (6.7% protein)	0.056	0.245	0.308	0.418	0.316	0.054	0.073	0.257	0.163	0.274	0.595	0.109
canned, solids and liquid (3.4% protein)	0.028	0.125	0.156	0.212	0.160	0.027	0.037	0.131	0.083	0.139	0.302	0.055

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
Leafy vegetables, raw (Protein, N×6.25):												
amaranth (3.5% protein)	0.038	0.056	0.164	0.206	0.141	0.025	0.024	0.096	0.105	0.136	0.134	0.069
beet greens (2.0% protein)	0.024	0.076	0.084	0.129	0.108	0.034	.....	0.116	.....	0.101	0.083	0.026
Brussels sprouts (4.4% protein)	0.044	0.153	0.186	0.194	0.197	0.046	.....	0.148	.....	0.193	0.279	0.106
cabbage (1.4% protein)	0.011	0.039	0.040	0.057	0.066	0.013	0.028	0.030	0.030	0.043	0.105	0.025
chard (1.4% protein)	0.014	0.058	0.060	0.076	0.055	0.004	.....	0.046	.....	0.055	0.035	0.018
chicory (1.6% protein)	0.024	.....	.....	.....	0.052	0.016	0.006	.....	0.040	.....	.....	0.024
collards (3.9% protein)	0.055	0.114	0.121	0.218	0.202	0.046	0.059	0.124	0.151	0.195	0.258	0.087
kale (3.9% protein)	0.042	0.139	0.133	0.252	0.121	0.035	0.036	0.158	.....	0.184	0.202	0.062
lettuce (1.2% protein)	0.012	.....	.....	.....	0.070	0.004	.....	.....	.....	.....	.....	.....
mustard greens (2.3% protein)	0.037	0.060	0.075	0.062	0.111	0.024	0.035	0.074	0.121	0.108	0.167	0.041
parsley, curly garden (2.5% protein)	0.050	.....	.....	.....	0.160	0.012	.....	.....	.....	.....	.....	.....
spinach (2.3% protein)	0.037	0.102	0.107	0.176	0.142	0.039	0.046	0.099	0.073	0.126	0.116	0.049
turnip greens (2.9% protein)	0.045	0.125	0.107	0.207	0.129	0.052	0.045	0.146	0.105	0.149	0.167	0.051
watercress (1.7% protein)	0.028	0.084	0.076	0.131	0.091	0.010	.....	0.062	0.036	0.084	0.053	0.034
Starchy roots and tubers (Protein, N×6.25):												
Apio arracacia (1.2% protein)	0.008	.....	.....	.....	0.042	0.003	.....	.....	.....	.....	.....	.....
cassava:												
flour (1.6% protein)	0.021	0.044	0.045	0.066	0.066	0.010	0.018	0.045	0.030	0.049	0.159	0.025
root (1.1% protein)	0.014	0.030	0.031	0.045	0.045	0.007	0.012	0.031	0.021	0.033	0.110	0.017
potatoes:												
raw (2.0% protein)	0.021	0.079	0.088	0.100	0.107	0.025	0.019	0.088	0.036	0.107	0.099	0.029
canned, solids and liquid (1.7% protein)	0.018	0.067	0.075	0.085	0.091	0.021	0.016	0.075	0.030	0.091	0.084	0.074
flour (7.1% protein)	0.076	0.279	0.311	0.353	0.378	0.089	0.068	0.314	0.127	0.379	0.350	0.102

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
sweet potatoes (*Ipomaea batatas*)												
raw (1.8% protein)	0.031	0.085	0.087	0.103	0.085	0.033	0.029	0.100	0.081	0.135	0.094	0.036
dehydrated (5.0% protein)	0.087	0.235	0.241	0.286	0.236	0.093	0.080	0.278	0.225	0.374	0.261	0.099
taro (1.9% protein)	0.035	0.089	0.099	0.169	0.110	0.021	.	0.099	...	0.114	0.118	0.032
yam (*Dioscorea* spp.) (2.1% protein)	0.035				0.110	0.034	.	.	......	......	......	......
Yautia malanga (1.7% protein)	0.023				0.067	0.016		.	..	...	......	......
Other vegetables (Protein, N×6.25)												
asparagus												
raw (2.2% protein)	0.027	0.066	0.080	0.096	0.103	0.032	.	0.069	.	0.106	0.123	0.036
canned, solids and liquid (1.9% protein)	0.023	0.057	0.069	0.083	0.089	0.027		0.060	..	0.092	0.106	0.031
beans, snap												
raw (2.4% protein)	0.033	0.091	0.109	0.139	0.126	0.035	0.024	0.057	0.050	0.115	0.101	0.045
canned, solids and liquid (1.0% protein)	0.014	0.038	0.045	0.058	0.052	0.014	0.010	0.024	0.021	0.048	0.042	0.019
beets.												
raw (1.6% protein)	0.014	0.034	0.051	0.055	0.086	0.006		0.027	...	0.049	0.028	0.022
canned, solids and liquid (0.9% protein)	0.008	0.019	0.029	0.031	0.048	0.003		0.015	.....	0.028	0.016	0.012
broccoli (3.3% protein)	0.037	0.122	0.126	0.163	0.147	0.050	.	0.119	....	0.170	0.192	0.063
carrots:												
raw (1.2% protein)	0.010	0.043	0.046	0.065	0.052	0.010	0.029	0.042	0.020	0.056	0.041	0.017
canned, solids and liquid (0.5% protein)	0.004	0.018	0.019	0.027	0.012	0.004	0.012	0.018	0.008	0.023	0.017	0.007
cauliflower (2.4% protein)	0.033	0.102	0.104	0.162	0.134	0.047	....	0.075	0.034	0.144	0.110	0.048
celery (1.3% protein)	0.012				0.021	0.015	0.006	......	0.016	......	......	......
chayote (0.6% protein)	0.008				0.038	0.001	...	......	......	....	......	......
cowpeas, yardlong, immature pod (3.4% protein)	0.034	.	.....	..	0.203	0.021	..	....	......	......	.....	......
cucumbers (0.7% protein)	0.005	0.019	0.022	0.030	0.031	0.007	....	0.016	....	0.024	0.053	0.001
cushaw (1.5% protein)	0.014	.			0.044	0.008	.....	.....	....	....	......	......
eggplant (1.1% protein)	0.010	0.035	0.056	0.068	0.030	0.006	....	0.048	......	0.065	0.037	0.019
mallow (3.7% protein).	0.144	0.155	.	0.259	0.155	0.030	....	0.166	......	0.181	0.189	0.063

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
Leafy vegetables, raw (Protein, N× 6.25):												
amaranth (3.5% protein)	0.038	0.056	0.164	0.206	0.141	0.025	0.024	0.096	0.105	0.136	0.134	0.069
beet greens (2.0% protein)	0.024	0.076	0.084	0.129	0.108	0.034	...	0.116		0.101	0.083	0.026
Brussels sprouts (4.4% protein)	0.044	0.153	0.186	0.194	0.197	0.046	...	0.148	...	0.193	0.279	0.106
cabbage (1.4% protein)	0.011	0.039	0.040	0.057	0.066	0.013	0.028	0.030	0.030	0.043	0.105	0.025
chard (1.4% protein)	0.014	0.058	0.060	0.076	0.055	0.004	...	0.046	...	0.055	0.035	0.018
chicory (1.6% protein)	0.024	...	...	...	0.052	0.016	0.006	...	0.040	...	...	0.024
collards (3.9% protein)	0.055	0.114	0.121	0.218	0.202	0.046	0.059	0.124	0.151	0.195	0.258	0.087
kale (3.9% protein)	0.042	0.139	0.133	0.252	0.121	0.035	0.036	0.158	...	0.184	0.202	0.062
lettuce (1.2% protein)	0.012	...	...	...	0.070	0.004	...	...	...	...	...	...
mustard greens (2.3% protein)	0.037	0.060	0.075	0.062	0.111	0.024	0.035	0.074	0.121	0.108	0.167	0.041
parsley, curly garden (2.5% protein)	0.050	...	...	...	0.160	0.012	...	...	...	...	...	...
spinach (2.3% protein)	0.037	0.102	0.107	0.176	0.142	0.039	0.046	0.099	0.073	0.126	0.116	0.049
turnip greens (2.9% protein)	0.045	0.125	0.107	0.207	0.129	0.052	0.045	0.146	0.105	0.149	0.167	0.051
watercress (1.7% protein)	0.028	0.084	0.076	0.131	0.091	0.010	...	0.062	0.036	0.084	0.053	0.034
Starchy roots and tubers (Protein, N× 6.25):												
Apio arracacia (1.2% protein)	0.008	...	...	...	0.042	0.003	...	...	...	...	...	...
cassava:												
flour (1.6% protein)	0.021	0.044	0.045	0.066	0.066	0.010	0.018	0.045	0.030	0.049	0.159	0.025
root (1.1% protein)	0.014	0.030	0.031	0.045	0.045	0.007	0.012	0.031	0.021	0.033	0.110	0.017
potatoes:												
raw (2.0% protein)	0.021	0.079	0.088	0.100	0.107	0.025	0.019	0.088	0.036	0.107	0.099	0.029
canned, solids and liquid (1.7% protein)	0.018	0.067	0.075	0.085	0.091	0.021	0.016	0.075	0.030	0.091	0.084	0.024
flour (7.1% protein)	0.076	0.279	0.311	0.353	0.378	0.089	0.068	0.314	0.127	0.379	0.350	0.102

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
sweet potatoes (*Ipomaea batatas*)												
raw (1.8% protein)	0.031	0.085	0.087	0.103	0.085	0.033	0.029	0.100	0.081	0.135	0.094	0.036
dehydrated (5.0% protein)	0.087	0.235	0.241	0.286	0.236	0.093	0.080	0.278	0.225	0.374	0.261	0.099
taro (1.9% protein)	0.035	0.089	0.099	0.169	0.110	0.021	.	0.099	...	0.114	0.118	0.032
yam (*Dioscorea* spp.) (2.1% protein)	0.035		.		0.110	0.034	..	...	...	...	...	...
Yautia malanga (1.7% protein)	0.023				0.067	0.016	.	.	..	....	......	.....
Other vegetables (*Protein, N×6.25*)												
asparagus:												
raw (2.2% protein)	0.027	0.066	0.080	0.096	0.103	0.032		0.069	...	0.106	0.123	0.036
canned, solids and liquid (1.9% protein)	0.023	0.057	0.069	0.083	0.089	0.027		0.060	...	0.092	0.106	0.031
beans, snap												
raw (2.4% protein)	0.033	0.091	0.109	0.139	0.126	0.035	0.024	0.057	0.050	0.115	0.101	0.045
canned, solids and liquid (1.0% protein)	0.014	0.038	0.045	0.058	0.052	0.014	0.010	0.024	0.021	0.048	0.042	0.019
beets.												
raw (1.6% protein)	0.014	0.034	0.051	0.055	0.086	0.006	.	0.027	....	0.049	0.028	0.022
canned, solids and liquid (0.9% protein)	0.008	0.019	0.029	0.031	0.048	0.003	.	0.015	....	0.028	0.016	0.012
broccoli (3.3% protein)	0.037	0.122	0.126	0.163	0.147	0.050	.	0.119	.....	0.170	0.192	0.063
carrots												
raw (1.2% protein)	0.010	0.043	0.046	0.065	0.052	0.010	0.029	0.042	0.020	0.056	0.041	0.017
canned, solids and liquid (0.5% protein)	0.004	0.018	0.019	0.027	0.022	0.004	0.012	0.018	0.008	0.023	0.017	0.007
cauliflower (2.4% protein)	0.033	0.102	0.104	0.162	0.134	0.047	...	0.075	0.034	0.144	0.110	0.048
celery (1.3% protein)	0.012	.		.	0.021	0.015	0.006	....	0.016	......	....	......
chayote (0.6% protein)	0.008	.	.		0.038	0.001	.	.....	....	......	......	......
cowpeas, yardlong, immature pod (3.4% protein)	0.034	.	.	.	0.203	0.021	...	.....	......	......	......	......
cucumbers (0.7% protein)	0.005	0.019	0.022	0.030	0.031	0.007	...	0.016	....	0.024	0.053	0.001
cushaw (1.5% protein)	0.014				0.044	0.008	.	.....	.....	......	......	......
eggplant (1.1% protein)	0.010	0.038	0.056	0.068	0.030	0.006	....	0.048	......	0.065	0.037	0.019
mallow (3.7% protein)	0.144	0.155	...	0.259	0.155	0.030	......	0.166	.....	0.181	0.189	0.063

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
Leafy vegetables, raw (Protein, N× 6.25):												
amaranth (3.5% protein)	0.038	0.056	0.164	0.206	0.141	0.025	0.024	0.096	0.105	0.136	0.134	0.069
beet greens (2.0% protein)	0.024	0.076	0.084	0.129	0.108	0.034	...	0.116	...	0.101	0.083	0.026
Brussels sprouts (4.4% protein)	0.044	0.153	0.186	0.194	0.197	0.046	...	0.148	...	0.193	0.279	0.106
cabbage (1.4% protein)	0.011	0.039	0.040	0.057	0.066	0.013	0.028	0.030	0.030	0.043	0.105	0.025
chard (1.4% protein)	0.014	0.058	0.060	0.076	0.055	0.004	...	0.046	...	0.055	0.035	0.018
chicory (1.6% protein)	0.024	...	...	...	0.052	0.016	0.006	...	0.040	...	...	0.024
collards (3.9% protein)	0.055	0.114	0.121	0.218	0.202	0.046	0.059	0.124	0.151	0.195	0.258	0.087
kale (3.9% protein)	0.042	0.139	0.133	0.252	0.121	0.035	0.036	0.158	...	0.184	0.202	0.062
lettuce (1.2% protein)	0.012	...	...	...	0.070	0.004	...	...	...	...	...	...
mustard greens (2.3% protein)	0.037	0.060	0.075	0.062	0.111	0.024	0.035	0.074	0.121	0.108	0.167	0.041
parsley, curly garden (2.5% protein)	0.050	...	...	...	0.160	0.012	...	...	...	...	...	...
spinach (2.3% protein)	0.037	0.102	0.107	0.176	0.142	0.039	0.046	0.099	0.073	0.126	0.116	0.049
turnip greens (2.9% protein)	0.045	0.125	0.107	0.207	0.129	0.052	0.045	0.146	0.105	0.149	0.167	0.051
watercress (1.7% protein)	0.028	0.084	0.076	0.131	0.091	0.010	...	0.062	0.036	0.084	0.053	0.034
Starchy roots and tubers (Protein, N× 6.25):												
Apio arracacia (1.2% protein)	0.008	...	...	...	0.042	0.003	...	...	...	...	...	...
cassava:												
flour (1.6% protein)	0.021	0.044	0.045	0.066	0.066	0.010	0.018	0.045	0.030	0.049	0.159	0.025
root (1.1% protein)	0.014	0.030	0.031	0.045	0.045	0.007	0.012	0.031	0.021	0.033	0.110	0.017
potatoes:												
raw (2.0% protein)	0.021	0.079	0.088	0.100	0.107	0.025	0.019	0.088	0.036	0.107	0.099	0.029
canned, solids and liquid (1.7% protein)	0.018	0.067	0.075	0.085	0.091	0.021	0.016	0.075	0.030	0.091	0.084	0.024
flour (7.1% protein)	0.076	0.279	0.311	0.353	0.378	0.089	0.068	0.314	0.127	0.379	0.350	0.102

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
sweet potatoes (*Ipomaea batatas*):												
raw (1.8% protein)	0.031	0.085	0.087	0.103	0.085	0.033	0.029	0.100	0.081	0.135	0.094	0.036
dehydrated (5.0% protein)	0.087	0.235	0.241	0.286	0.236	0.093	0.080	0.278	0.225	0.374	0.261	0.099
taro (1.9% protein)	0.035	0.089	0.099	0.169	0.110	0.021	.	0.099	.....	0.114	0.118	0.032
yam (*Dioscorea* spp.) (2.1% protein)	0.035		.		0.110	0.034	.	...	......	.....	......	......
Yautia malanga (1.7% protein)	0.023			.	0.067	0.016		...	......	.....	......	......
Other vegetables (Protein, N×6.25)												
asparagus												
raw (2.2% protein)	0.027	0.066	0.080	0.096	0.103	0.032		0.069	...	0.106	0.123	0.036
canned, solids and liquid (1.9% protein)	0.023	0.057	0.069	0.083	0.089	0.027	..	0.060	....	0.092	0.106	0.031
beans, snap												
raw (2.4% protein)	0.033	0.091	0.109	0.139	0.126	0.035	0.024	0.057	0.050	0.115	0.101	0.045
canned, solids and liquid (1.0% protein)	0.014	0.038	0.045	0.058	0.052	0.014	0.010	0.024	0.021	0.048	0.042	0.019
beets:												
raw (1.6% protein)	0.014	0.034	0.051	0.055	0.086	0.006	....	0.027	...	0.049	0.028	0.022
canned, solids and liquid (0.9% protein)	0.008	0.019	0.029	0.031	0.048	0.003	.	0.015	...	0.028	0.016	0.012
broccoli (3.3% protein)	0.037	0.122	0.126	0.163	0.147	0.050		0.119	....	0.170	0.192	0.063
carrots:												
raw (1.2% protein)	0.010	0.043	0.046	0.065	0.052	0.010	0.029	0.042	0.020	0.056	0.041	0.017
canned, solids and liquid (0.5% protein)	0.004	0.018	0.019	0.027	0.022	0.004	0.012	0.018	0.008	0.023	0.017	0.007
cauliflower (2.4% protein)	0.033	0.102	0.104	0.162	0.134	0.047	...	0.075	0.034	0.144	0.110	0.048
celery (1.3% protein)	0.012	.			0.021	0.015	0.006	....	0.016	......	......	......
chayote (0.6% protein)	0.008	.		..	0.038	0.001	.....	.....	......	......	......	......
cowpeas, yardlong, immature pod (3.4% protein)	0.034		...	...	0.203	0.021	......	......	......	......	......	......
cucumbers (0.7% protein)	0.005	0.019	0.022	0.030	0.031	0.007	...	0.016	......	0.074	0.053	0.001
cushaw (1.5% protein)	0.014	.	...		0.044	0.008	...	......	......	.....	......	......
eggplant (1.1% protein)	0.010	0.038	0.056	0.068	0.030	0.006	.....	0.048	.....	0.065	0.037	0.019
mallow (3.7% protein)	0.144	0.155	...	0.259	0.155	0.030	....	0.166	.....	0.181	0.189	0.063

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
Leafy vegetables, raw (Protein, N× 6.25):												
amaranth (3.5% protein)	0.038	0.056	0.164	0.206	0.141	0.025	0.024	0.096	0.105	0.136	0.134	0.069
beet greens (2.0% protein)	0.024	0.076	0.084	0.129	0.108	0.034	...	0.116	...	0.101	0.083	0.026
Brussels sprouts (4.4% protein)	0.044	0.153	0.186	0.194	0.197	0.046	...	0.148	...	0.193	0.279	0.106
cabbage (1.4% protein)	0.011	0.039	0.040	0.057	0.066	0.013	0.028	0.030	0.030	0.043	0.105	0.025
chard (1.4% protein)	0.014	0.058	0.060	0.076	0.055	0.004	...	0.046	...	0.055	0.035	0.018
chicory (1.6% protein)	0.024	...		...	0.052	0.016	0.006	...	0.040	...	...	0.024
collards (3.9% protein)	0.055	0.114	0.121	0.218	0.202	0.046	0.059	0.124	0.151	0.195	0.258	0.087
kale (3.9% protein)	0.042	0.139	0.133	0.252	0.121	0.035	0.036	0.158	...	0.184	0.202	0.062
lettuce (1.2% protein)	0.012	...	...	...	0.070	0.004	...	...	...	...	...	...
mustard greens (2.3% protein)	0.037	0.060	0.075	0.062	0.111	0.024	0.035	0.074	0.121	0.108	0.167	0.041
parsley, curly garden (2.5% protein)	0.050		...	...	0.160	0.012	...	...	...	...	...	...
spinach (2.3% protein)	0.037	0.102	0.107	0.176	0.142	0.039	0.046	0.099	0.073	0.126	0.116	0.049
turnip greens (2.9% protein)	0.045	0.125	0.107	0.207	0.129	0.052	0.045	0.146	0.105	0.149	0.167	0.051
watercress (1.7% protein)	0.028	0.084	0.076	0.131	0.091	0.010	...	0.062	0.036	0.084	0.053	0.034
Starchy roots and tubers (Protein, N× 6.25):												
Apio arracacia (1.2% protein)	0.008	...	...	...	0.042	0.003	...	...	...	...	...	...
cassava:												
flour (1.6% protein)	0.021	0.044	0.045	0.066	0.066	0.010	0.018	0.045	0.030	0.049	0.159	0.025
root (1.1% protein)	0.014	0.030	0.031	0.045	0.045	0.007	0.012	0.031	0.021	0.033	0.110	0.017
potatoes:												
raw (2.0% protein)	0.021	0.079	0.088	0.100	0.107	0.025	0.019	0.088	0.036	0.107	0.099	0.029
canned, solids and liquid (1.7% protein)	0.018	0.067	0.075	0.085	0.091	0.021	0.016	0.075	0.030	0.091	0.084	0.024
flour (7.1% protein)	0.076	0.279	0.311	0.353	0.378	0.089	0.068	0.314	0.127	0.379	0.350	0.102

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm)	Threonine (Gm)	Isoleucine (Gm)	Leucine (Gm)	Lysine (Gm)	Methionine (Gm)	Cystine (Gm)	Phenylalanine (Gm)	Tyrosine (Gm.)	Valine (Gm)	Arginine (Gm)	Histidine (Gm)
VEGETABLES—*Continued*												
sweet potatoes (*Ipomaea batatas*).												
raw (1.8% protein)	0.031	0.085	0.087	0.103	0.085	0.033	0.029	0.100	0.081	0.135	0.094	0.036
dehydrated (5.0% protein)	0.087	0.235	0.241	0.286	0.236	0.093	0.080	0.278	0.225	0.374	0.261	0.099
taro (1.9% protein)	0.035	0.089	0.099	0.169	0.110	0.021	.	0.099	...	0.114	0.118	0.032
yam (*Dioscorea* spp.) (2.1% protein)	0.035				0.110	0.034	..	...	...	...	...	...
Yautia malanga (1.7% protein)	0.023				0.067	0.016	..		..	...	...	...
Other vegetables (*Protein, N×6.25*)												
asparagus.												
raw (2.2% protein)	0.027	0.066	0.080	0.096	0.103	0.032	.	0.069	...	0.106	0.123	0.036
canned, solids and liquid (1.9% protein)	0.023	0.057	0.069	0.083	0.089	0.027	..	0.060	...	0.092	0.106	0.031
beans, snap												
raw (2.4% protein)	0.033	0.091	0.109	0.139	0.126	0.035	0.024	0.057	0.050	0.115	0.101	0.045
canned, solids and liquid (1.0% protein)	0.014	0.038	0.045	0.058	0.052	0.014	0.010	0.024	0.021	0.048	0.042	0.019
beets.												
raw (1.6% protein)	0.014	0.034	0.051	0.055	0.086	0.006	.	0.027	...	0.049	0.028	0.022
canned, solids and liquid (0.9% protein)	0.008	0.019	0.029	0.031	0.048	0.003	.	0.015	...	0.028	0.016	0.012
broccoli (3.3% protein)	0.037	0.122	0.126	0.163	0.147	0.050	...	0.119	...	0.170	0.192	0.063
carrots:												
raw (1.2% protein)	0.010	0.043	0.046	0.065	0.052	0.010	0.029	0.042	0.020	0.056	0.041	0.017
canned, solids and liquid (0.5% protein)	0.004	0.018	0.019	0.027	0.022	0.004	0.012	0.018	0.008	0.023	0.017	0.007
cauliflower (2.4% protein)	0.033	0.102	0.104	0.162	0.134	0.047	...	0.075	0.034	0.144	0.110	0.048
celery (1.3% protein)	0.012	..	..	..	0.021	0.015	0.006	...	0.016	...	...	...
chayote (0.6% protein)	0.008	..		.	0.038	0.001	...	...	...	...	...	...
cowpeas, yardlong, immature pod (3.4% protein)	0.034	..	...	..	0.203	0.021	...	...	...	...	...	...
cucumbers (0.7% protein)	0.005	0.019	0.022	0.030	0.031	0.007	...	0.016	...	0.024	0.053	0.001
cushaw (1.5% protein)	0.014	..	...	.	0.044	0.008	...	...	...	...	...	...
eggplant (1.1% protein)	0.010	0.038	0.056	0.068	0.030	0.006	...	0.048	...	0.065	0.037	0.019
mallow (3.7% protein)	0.144	0.155	...	0.259	0.155	0.030	...	0.166	...	0.181	0.189	0.063

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm)	Threonine (Gm)	Isoleucine (Gm)	Leucine (Gm)	Lysine (Gm)	Methionine (Gm)	Cystine (Gm)	Phenylalanine (Gm.)	Tyrosine (Gm)	Valine (Gm)	Arginine (Gm)	Histidine (Gm)
VEGETABLES—*Continued*												
Leafy vegetables, raw (*Protein*, *N*× 6 25):												
amaranth (3 5% protein)	0.038	0.056	0.164	0.206	0.141	0.025	0.024	0.096	0.105	0.136	0.134	0.069
beet greens (2 0% protein)	0.024	0.076	0.084	0.129	0.108	0.034	...	0.116	...	0.101	0.083	0.026
Brussels sprouts (4 4% protein)	0.044	0.153	0.186	0.194	0.197	0.046	...	0.148	...	0.193	0.279	0.106
cabbage (1 4% protein)	0.011	0.039	0.040	0.057	0.066	0.013	0.028	0.030	0.030	0.043	0.105	0.025
chard (1.4% protein)	0.014	0.058	0.060	0.076	0.055	0.004	...	0.046	...	0.055	0.035	0.018
chicory (1 6% protein)	0.024	...	...	...	0.052	0.016	0.006	...	0.040	...	...	0.024
collards (3 9% protein)	0.055	0.114	0.121	0.218	0.202	0.046	0.059	0.124	0.151	0.195	0.258	0.087
kale (3 9% protein)	0.042	0.139	0.133	0.252	0.121	0.035	0.036	0.158	...	0.184	0.202	0.062
lettuce (1.2% protein)	0.012				0.070	0.004	...	...	...	...	...	...
mustard greens (2.3% protein)	0.037	0.060	0.075	0.062	0.111	0.024	0.035	0.074	0.121	0.108	0.167	0.041
parsley, curly garden (2 5% protein)	0.050			...	0.160	0.012	...	...	...	...	...	...
spinach (2.3% protein)	0.037	0.102	0.107	0.176	0.142	0.039	0.046	0.099	0.073	0.126	0.116	0.049
turnip greens (2 9% protein)	0.045	0.125	0.107	0.207	0.129	0.052	0.045	0.146	0.105	0.149	0.167	0.051
watercress (1.7% protein)	0.028	0.084	0.076	0.131	0.091	0.010	...	0.062	0.036	0.084	0.053	0.034
Starchy roots and tubers (*Protein*, *N*× 6 25):												
Apio arracacia (1.2% protein)	0.008	...	...	...	0.042	0.003	...	...	...	...	...	...
cassava:												
flour (1.6% protein)	0.021	0.044	0.045	0.066	0.066	0.010	0.018	0.045	0.030	0.049	0.159	0.025
root (1.1% protein)	0.014	0.030	0.031	0.045	0.045	0.007	0.012	0.031	0.021	0.033	0.110	0.017
	0.021	0.079	0.088	0.100	0.107	0.025	0.019	0.088	0.036	0.107	0.099	0.029
			0.075	0.085	0.091	0.021	0.016	0.075	0.030	0.091	0.084	0.024
					0.178	0.089	0.068	0.314	0.127	0.379	0.350	0.102

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
sweet potatoes (*Ipomaea batatas*):												
raw (1.8% protein)	0.031	0.085	0.087	0.103	0.085	0.033	0.029	0.100	0.081	0.135	0.094	0.036
dehydrated (5.0% protein)	0.087	0.235	0.241	0.286	0.236	0.093	0.080	0.278	0.225	0.374	0.261	0.099
taro (1.9% protein)	0.035	0.089	0.099	0.169	0.110	0.021		0.099	...	0.114	0.118	0.032
yam (*Dioscorea* spp.) (2.1% protein)	0.035				0.110	0.034	...	...	...	...	...	...
Yautia malanga (1.7% protein)	0.023				0.067	0.016		...	...	...	...	...
Other vegetables (Protein, N×6.25)												
asparagus:												
raw (2.2% protein)	0.027	0.066	0.080	0.096	0.103	0.032	...	0.069	...	0.106	0.123	0.036
canned, solids and liquid (1.9% protein)	0.023	0.057	0.069	0.083	0.089	0.027	...	0.060	...	0.092	0.106	0.031
beans, snap:												
raw (2.4% protein)	0.033	0.091	0.109	0.139	0.126	0.035	0.024	0.057	0.050	0.115	0.101	0.045
canned, solids and liquid (1.0% protein)	0.014	0.038	0.045	0.058	0.052	0.014	0.010	0.024	0.021	0.048	0.042	0.019
beets:												
raw (1.6% protein)	0.014	0.034	0.051	0.055	0.086	0.006	...	0.027	...	0.049	0.028	0.022
canned, solids and liquid (0.9% protein)	0.008	0.019	0.029	0.031	0.048	0.003	...	0.015	...	0.028	0.016	0.012
broccoli (3.3% protein)	0.037	0.122	0.126	0.163	0.147	0.050	...	0.119	...	0.170	0.192	0.063
carrots:												
raw (1.2% protein)	0.010	0.043	0.046	0.065	0.052	0.010	0.029	0.042	0.020	0.056	0.041	0.017
canned, solids and liquid (0.5% protein)	0.004	0.018	0.019	0.027	0.022	0.004	0.012	0.018	0.008	0.023	0.017	0.007
cauliflower (2.4% protein)	0.033	0.102	0.104	0.162	0.134	0.047	...	0.075	0.034	0.144	0.110	0.048
celery (1.3% protein)	0.012		...	...	0.021	0.015	0.006	...	0.016	...	...	...
chayote (0.6% protein)	0.008				0.038	0.001	...	...	...	...	...	...
cowpeas, yardlong, immature pod (3.4% protein)	0.034	...	...	...	0.203	0.021	...	...	...	...	...	...
cucumbers (0.7% protein)	0.005	0.019	0.022	0.030	0.031	0.007	...	0.016	...	0.024	0.053	0.001
cushaw (1.5% protein)	0.014	...			0.044	0.008	...	...	...	...	...	...
eggplant (1.1% protein)	0.010	0.038	0.056	0.068	0.030	0.006	...	0.048	...	0.065	0.037	0.019
mallow (3.7% protein)	0.144	0.155	...	0.259	0.155	0.030	...	0.166	...	0.181	0.189	0.063

TABLE 43—*Continued*

Protein Content, and Nitrogen Conversion Factor	Tryptophan (Gm.)	Threonine (Gm.)	Isoleucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methionine (Gm.)	Cystine (Gm.)	Phenylalanine (Gm.)	Tyrosine (Gm.)	Valine (Gm.)	Arginine (Gm.)	Histidine (Gm.)
VEGETABLES—*Continued*												
mushrooms:												
(*Agaricus campestris*)*	0.006		0.532	0.281	...	0.167	...	...	...	0.378	0.235	...
(*Lactarius* spp.)†	0.006	0.156	0.201	0.139	0.088	0.021	...	0.018	...	0.116	0.021	0.027
okra (1.8% protein)	0.018	0.066	0.069	0.101	0.076	0.022	0.017	0.065	0.079	0.091	0.093	0.030
onions, mature (1.4% protein)	0.021	0.022	0.021	0.037	0.064	0.013	...	0.039	0.046	0.031	0.180	0.014
peppers (1.2% protein)	0.009	0.050	0.046	0.046	0.051	0.016	...	0.055	...	0.033	0.024	0.014
prickly pears (1.1% protein)	0.009	0.053	0.044	0.057	0.044	0.008	...	0.059	...	0.041	0.032	0.016
pumpkin (1.2% protein)	0.016	0.028	0.044	0.063	0.058	0.011	...	0.032	0.016	0.045	0.043	0.019
radishes (1.2% protein)	0.005	0.059	...	...	0.034	0.002	...	...	...	0.030	...	...
seepweed (2.6% protein)	0.027	0.089	0.113	0.152	0.089	0.013	...	0.116	...	0.091	0.062	0.036
soybean sprouts (6.2% protein)	...	0.159	0.225	0.265	0.211	0.045	...	0.186	...	0.225	0.225	0.133
squash, summer (0.6% protein)	0.005	0.014	0.019	0.027	0.023	0.008	...	0.016	...	0.022	0.027	0.009
tomatoes and cherry tomatoes (1.0% protein)	0.009	0.033	0.029	0.041	0.042	0.007	...	0.028	0.014	0.028	0.029	0.015
turnips (1.1% protein)	...	...	0.020	...	0.057	0.012	...	0.020	0.029	...	...	...
waxgourd, Chinese (0.4% protein)	0.002	...	...	...	0.009	0.003	...	...	...	...	...	...
MISCELLANEOUS FOOD ITEMS												
Vegetable patty or steak (principally wheat protein) (15% protein, N×5.70)	0.142	0.411	0.884	1.079	0.321	0.253	...	0.811	...	0.705	0.597	0.321
Yeast:												
baker's, compressed‡ (N×6.25)	0.122	0.655	0.655	1.151	0.914	0.248	0.120	0.607	0.580	0.840	0.536	0.353
brewer's, dried§ (N×6.25)	0.710	2.353	2.398	3.226	3.300	0.836	0.548	1.902	1.902	2.723	2.250	1.251
primary, dried:												
(*Saccharomyces cerevisiae*)§ (N×6.25)	0.636	2.353	2.708	3.300	3.337	0.851	0.444	1.813	2.472	2.553	1.931	1.103
(*Torulopsis utilis*)§ (N×6.25)	0.636	2.331	3.323	3.707	3.648	0.710	0.422	2.361	2.464	2.901	3.337	1.251

* Total nitrogen is 0.58%. This is equivalent to 2.4% protein on the basis that two-thirds of the nitrogen is protein nitrogen. If total nitrogen is used for the calculation, the protein content is 3.6%.

† Total nitrogen is 0.69%. This is equivalent to 2.9% protein on the basis that two-thirds of the nitrogen is protein nitrogen. If total nitrogen is used for the calculation, the protein content is 4.3%.

‡ Total nitrogen is 2.1%. This is equivalent to 10.6% protein on the basis that four-fifths of the nitrogen is protein nitrogen. If total nitrogen is used for the calculation, the protein content is 13.1%.

§ Total nitrogen is 7.4%. This is equivalent to 36.9% protein on the basis that four-fifths of the nitrogen is protein nitrogen. If total nitrogen is used for the calculation, the protein content is 46.1%.

APPENDIX 7

Sodium and Potassium Content of Foods and Public Water Supplies

TABLE 44*

Sodium Content of Foods

Food	Sodium (Mg/100 Gm)
Almonds, unsalted	3
Apples, raw	1
cider	1
sauce, canned	2†
Apricots, raw	1
unpeeled, canned	4†
dried	10‡
Asparagus, raw	3
canned without added sodium	4†
Avocado, raw	3
Bacon, raw, cured	700†‡
fried crisp	2,400†‡
Baking powder, ordinary (av)	9,000‡
low-sodium	35
Bananas	1
Barley, pearled	3
Beans, dry, (Navy, pea, etc)	1
Beans, lima, raw	1
lima, frozen	Variable†
lima, canned without added sodium	2†
Beans, snap, green and yellow wax, raw	1
Beans, snap, green and yellow wax, frozen	2
Beans, snap, green and yellow wax, canned without added sodium	2†
Beef, lean, muscle, raw	70
Beef heart, raw	85
Beef kidney, raw	200‡
Beef liver, raw	130‡
Beef tongue, raw, unsmoked	80
Beets, raw	60‡
canned without added sodium	40‡
Beet greens, raw	130
Beverages	
beer	7‡
soft drinks (Cola drinks, fruit soda, ginger ale, root beer, etc)	7‡
wine (average)	7‡
Blackberries, raw	1
canned	1†
Blueberries, raw	1
canned	1†
Bread, rye	600†‡
rye, unsalted	30†‡
Bread, white, enriched	600†‡
white, unsalted	30†‡
Bread, whole wheat	600†‡
whole wheat, unsalted	30†‡
Broccoli, raw	15
frozen	15
Brussels sprouts, raw	12
frozen	12
Butter, salted	1,000†‡
unsalted, or sweet	10†‡
Buttermilk, cultured	130

Food	Sodium (Mg/100 Gm)
Cabbage, raw	15
Candy	Variable†
Cantaloupe	13
Carrots, raw	50
canned without added sodium	35†
Cauliflower, raw	20
frozen	20
Celery	100
Cereals, dry	
"All Bran"	1,400
corn flakes	660
"Cream of Wheat," plain	2
"Cream of Wheat," quick-cooking, enriched	90
Farina, unsalted	2
"Grape-Nuts"	660
"Instant Ralston"	1
"Maltex"	4
"Muflets"	4
"Pabena"	640
"Pablum"	620
"Pettijohn's"	2
rice flakes	720
rice, puffed	1
rolled oats	2
wheat, cracked	1
wheat germ, malt-flavored, "Zing"	9
wheat flakes	1,300
wheat flakes, unsalted	2
wheat, puffed	4
wheat, shredded	2
"Wheatena"	2
Chard, raw	100‡
Cheese, Cheddar	700†
cottage	290†
cottage, unsalted (curd)	20†
cream, Philadelphia	250†
process	1,500†
Swiss, domestic	700†
Cherries, raw	2
frozen	2
canned	2†
Chicken (av light and dark meat)	75‡
Chocolate, bitter	10
Cocoa, Dutch process	60†
plain, "Hershey"	5
Coconut, raw	30
dried, shredded	20
Coffee, roasted, dry	2
Corn, dry, white	1
dry, yellow	1
sweet, raw	1
sweet, canned without added sodium	2†
Corn meal	2
Crackers	Variable†
Graham	710

* *Estimated Best Values from Sodium Restricted Diets* ("Food and Nutrition Board, National Research Council, Publications," No 325 (1954))

† The estimated sodium values may be altered by various factors such as (1) a high-sodium packing water in the case of canned foods, (2) quality separation by means of brine in the case of canned and frozen peas, lima beans, etc , (3) lye peeling (canned peaches, citrus fruits, apricots, beets, tomatoes), (4) variation in the amounts of sodium chloride or sodium-containing compounds added during manufacture (bread, cookies, cheese, meats, etc) The figures for canned foods also apply to the glass-packed product Many

TABLE 44—*Continued*

Food	Sodium
"Ry-Krisp"	
soda	
matzoth	
matzoth, unsalted, plain	
Cranberries	1
sauce, canned	1†
Cream	40
Cucumber, raw	5‡
Currants, raw	2
dried	20
Dates	1
Duck	85‡
Eggs, whole	130
whites only	150
yolks only	85
Eggplant	2
Figs, raw	2
canned	2†
dried	34
Fish and Shellfish	
bluefish, raw, unsalted	68
catfish, raw, unsalted	60
codfish, raw, unsalted	65
crab, boiled	370
flounder, raw, unsalted	68
halibut, raw, unsalted	56
herring, raw, unsalted	100
lobster, boiled	250‡
oysters, raw	Variable
rockfish, raw, unsalted	45
salmon, raw, unsalted	50
canned without added sodium	60†
canned	540†
sardines, canned	550†‡
shrimp, raw	140
tuna, canned	800†
canned without added sodium	50†
Flour, bleached, enriched; *whole* wheat; rye; buckwheat, etc	2
Flour, self-rising	1,500†
Fruit cocktail, canned	5†
Gelatin, plain	30‡
dessert, flavored	330‡
flavored, without added sodium	10‡
Goose, raw	85‡
Grapes	2
Grapefruit	1
canned	2†
Grapefruit juice, canned	2†
Ham, cured	1,100†
Hominy, canned	250†
Honey	7
Ice cream	90
Jam	12†
Jelly	12†
Kale	80‡
Lamb, lean, raw	90
Lemons, pulp and juice	1
Lettuce, head	15‡
Liver, beef, raw	130‡
chicken, raw	85
goose, raw	140
pork, raw	80
turkey, raw	50
Macaroni, plain	5‡
Margarine, salted	1,100†
unsalted	10†
Mayonnaise, without added sodium	25†
Milk, *fresh, whole or* skim	50
evaporated, canned	100
skim, dried	525
malted, dry	440
"Lesofac" (modified low-sodium milk powder)	13
"Lonalac" (modified low-sodium milk powder)	15
Molasses	40‡
Mushrooms, raw	5
canned without added sodium	3†
Noodles, egg	10
Nuts, all, unsalted (average)	4

Food	Sodium (Mg/100 Gm)
[illegible]d-liver, ol	
[illegible]	Negligible
[illegible]	1
[illegible]	2,000†
Onions	10‡
Oranges	1
Orange juice, canned	1
Parsley, raw	30
Parsnips, raw	8
Peaches, raw	1
frozen	3
canned	2†
Peanut butter, prepared without added sodium	5†
Pears, raw	2
canned	2†
Peas, raw	2
frozen	Variable†
canned without added sodium	2†
dried	20‡
Peppers, green, raw	1
Pineapple, raw	1
frozen	1
canned	2†
Pineapple juice, canned	1†
Plums, raw	1
canned	1†
Pork, lean, raw	55
Potatoes, white, raw	3
Prunes, raw	1
canned	3†
dried	6
Prune juice	2
Pumpkin, raw	1
Rabbit	40
Radish	15‡
Raisins	25
Raspberries, raw	1
canned	2†
Rhubarb, raw	2
frozen	2
Rice, dry, polished	2
Sauerkraut, canned	650†
Shortening ("Crisco," "Spry," lard, etc)	Negligible
Sirup, corn ("Karo")	68
maple	14
sorghum	20‡
table blends	60‡
Soybeans, dry	4
Spaghetti, plain	5‡
Spices and herbs (all spices with the exceptions of celery seed and flakes and parsley flakes may be used in sodium-restricted diets)	
Spinach, raw	75‡
canned without added sodium	50†‡
frozen	70‡
Squash, raw, all types	1
Starch, corn	4
Strawberries, raw	1
Strawberries, frozen sweetened	2
canned	1†
Sugar, white	Negligible
light brown	25‡
Sweet potato, raw	10‡
Tangerines	1
Tapioca, dry	4
Tea, blend, dry	4
Tomatoes, raw	5
canned without added sodium	3†
Tomato juice, canned	230†
canned without added sodium	5†
Turkey, raw	65‡
Turnips, white	40‡
yellow	5
Turnip greens	10
Veal, raw	100‡
Vinegar	1
Watermelon	1
Yeast, baker's	3
cultured, dry	Variable

TABLE 45*

SODIUM AND POTASSIUM CONTENT OF FOODS
(Analyses Made on Edible Portions of Unprocessed Foods except as Otherwise Designated)

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
All-Bran cereal	1,400	1,200
Allspice	62	680
Almond		
raw	3	690
roasted in oil, salted	160	710
Anchovy paste	9,800	200
Apples		
juice (sweet cider), bottled	4	100
June, less skin and core	0.1	71
Mackintosh, less skin and core	0.2	90
Red Delicious, less skin and core	0.3	76
sauce, canned	0.3	55
Apricot		
canned in syrup	2	65
dried	11	1,700
raw, with skin	0.6	440
Artichoke, globe	43	430
Asparagus		
spears, canned	410	230
tips, fresh	2	240
tips, frozen	3	320
Avocado	3	340
Bacon		
fried crisp	2,400	390
raw	680	110
Baking powder,		
alum type	10,000	150
phosphate type	9,000	170
tartrate type	7,300	5,000
Banana	0.5	420
Barley, pearled	3	160
Beans		
baked, Heinz, navy		
with pork and tomato sauce, canned	480	210
with tomato sauce, canned	400	240
dry, navy	2	1,300
green, in pods		
canned	410	120
fresh	0.9	300
frozen	2	110
Lima		
canned	310	210
fresh	2	680
frozen	310	580
Beef		
corned	1,300	60
dried	4,300	200
lean, koshered, raw	1,600	290
lean, raw	51	360
Beer	8	46
Beets		
canned	36	120
greens, fresh	130	570
raw	110	350
Blackberry	0.2	150
Blueberry	0.6	89
Bouillon cube	24,000	100
Brain, pig	150	340
Bran, wheat, crude	15	980
Brandy	3	4
Brazil nuts		
raw	1	670
roasted in oil, salted	190	730
Bread		
Boston brown, with raisins	280	360
low-sodium—4 laboratory samples	3	94
low-sodium cinnamon roll—laboratory sample	2	120
low-sodium—14 commercial "salt free" breads		
maximum	76	200
minimum	4	72
average	28	120
Passover—*see* Matzoth		
rye and wheat	590	160
white, enriched	640	180
whole wheat	930	230
whole wheat and white	620	250
Breakfast cereals—*see under* individual cereal		
Broccoli		
fresh	16	400
frozen	13	250
Brussels sprouts		
fresh	11	450
frozen	9	300
Butter		
theoretical sodium value based on U S average salt content of 2.5%	980	
4 Indiana samples	880	23
unsalted	5	4
Buttermilk, cultured	130	140
Cabbage	5	230
Candy		
bar, Baby Ruth	170	300
bar, Milky Way	220	150
bar, Oh Henry	76	420
gumdrop	41	18
marshmallow	41	6
milk chocolate	86	420
Necco wafers	5	2
peppermint patty, Schrafft's	10	110
sweet chocolate	35	230
Cantaloupe	12	230
Caraway seed	17	1,400
Carbonated drinks—*see under* individual drinks		
Carrots		
canned	280	110
scraped and trimmed	31	410
Casein		
acid-washed	0.4	2
low ash commercial	13	39
vitamin free	160	900
Cashew nuts		
raw	14	560
roasted in oil, salted	200	560
Catchup, tomato	1,300	800
Catfish (fiddler), Ohio River	60	330
Cauliflower		
buds	24	400
buds, frozen	22	290
Caviar, salmon, canned	2,200	150
Celery		
salt	28,000	380
seed	140	1,400
stalks, less leaves	110	300

* Tables 45 and 46 were compiled by Charles E. Bills, Francis G. McDonald, William Niedermeier, and Melvin C. Schwartz and published in J. Am. Dietet. A., 25: 304-14, 1949.

TABLE 45—*Continued*

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
Cereals, dry		
bran		
All-Bran	1,400	1,200
crude, unsalted	15	980
corn flakes	660	160
farina		
Cream of Wheat, plain	2	86
Cream of Wheat, quick-cooking, enriched	90	84
Grape-Nuts	660	230
Pabena	640	340
Pablum	620	380
Rolled oats	2	340
Ry-Krisp	1,500	600
Wheat·		
flakes	1,300	320
germ, malt-flavored, Zing	9	780
Instant Ralston	1	360
Maltex	4	250
Muffets	4	300
Pettijohn's	2	380
Puffed	4	340
Shredded	2	330
Wheatena	2	380
Certo (pectin solution)	15	110
Chard		
large leaves	210	720
small leaves	84	380
Cheese		
American Swiss	710	100
Cheddar	700	92
cottage	290	72
cream, *Philadelphia*	250	74
process	1,500	80
whey, Velveeta	1,600	270
Cherries		
sour, frozen in syrup	2	78
sweet		
dark		
raw	1	260
canned in syrup	0.8	77
frozen in syrup	1	280
light, canned in syrup	3	55
Chestnut	2	410
Chicken, raw		
breast meat	78	320
leg meat	110	250
Chocolate—*see also under* individual candy		
syrup, Hershey	60	130
unsweetened	4	830
Cider, sweet (apple juice), bottled	4	100
Cinnamon	8	200
Citron, candied	290	120
Clam	180	240
Clove	210	1,000
Coca-Cola	1	52
Cocoa		
Dutch process	57	3,200
plain, Hershey	5	1,400
Coconut		
dry, shredded	16	770
meat	29	320
milk	53	190
Cod		
raw	60	360
frozen fillets	400	400
-liver oil	0.1	0
salted, dried	8,100	160
Coffee		
instant, Nescafé, dry	84	3,100
roasted		
decaffeinated, Sanka, dry	6	2,000
regular, dry	2	1,600

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
Cookie, salt-free, Betty Bakerite	12	240
Corn		
flakes	660	160
meal, yellow, enriched, degerminated	0.7	120
oil	0.2	0.1
popcorn, popped and oiled	3	240
popcorn, popped, oiled, and salted	2,000	240
starch	4	4
sweet		
white		
canned	200	200
milk stage	0.3	240
yellow		
canned	210	200
frozen	9	190
milk stage	0.4	370
yellow field, dry—5 varieties	0.6	290
Cowpeas, *fresh*, shelled	2	560
Crab, *canned*	1,000	110
Crackers		
graham	710	330
rye, Ry-Krisp	1,500	600
soda	1,100	120
unsalted, Jewish—*see* Matzoth		
Cranberry		
raw	1	65
sauce, canned	1	17
Cream of *tartar—theoretical* value for pure $KHC_4H_4O_6$	0	20,776
Cream, whipping, 32% fat	40	56
Crisco (vegetable shortening)	4	0
Cucumber, less parings	0.9	230
Currants		
red	2	160
Zante, dried (Zante raisins)	22	730
Curry powder	45	1,300
Dandelion greens	76	430
Date, semi-dry, California	1	790
Dextri-Maltose		
No 1	840	160
No 2	46	160
No 3	46	1,300
B	52	360
Dextrin	14	14
Dextrose	1	0.4
Dill, seed	13	1,000
Duck, domesticated, raw		
breast meat	68	360
leg meat	96	210
Egg		
whites *only*	110	100
whole	81	100
yolks only	26	100
Eggplant, less skin	0.9	190
Endive greens	18	400
Farina		
Cream of Wheat, plain, dry	2	86
Cream of Wheat, quick-cooking, enriched, dry	90	84
Figs		
canned in syrup	1	105
dried	34	780
raw	2	190
Filberts (hazelnuts)	1	560
Flour		
bleached		
enriched, Gold Medal	1	86
enriched, phosphated	13	78
buckwheat	1	680
gluten	2	24
rye, dark	1	860

TABLE 45—*Continued*

	Sodium	Potassium		Sodium	Potassium
Garlic, less skin	[illegible]	510	Lonalac, dry	13	1,300
Gelatin			Macaroni, plain, dry	1	160
dessert, flavored, Jell-O	330	210	Mace	45	180
plain	36	22	Maize—*see* Corn		
Gin	0.7	0.3	Maltex cereal, dry	4	250
Ginger	29	1,100	Maple syrup	14	130
Ginger ale	8	0.6	Marmalade, orange	13	19
Gizzard, turkey	58	170	*Matzoth*		
Gluten flour	2	24	American style (salted)	470	120
Goose, raw			egg	16	160
breast meat	76	420	farfel (dough balls)	28	130
leg meat	96	420	meal	4	130
Gooseberry			Passover (Passover bread)	1	140
frozen	2	150	plain	1	160
raw	0.7	87	poppy seed	350	110
Grapes			thin tea	2	130
Concord, less seeds and skin	3	84	whole wheat	280	470
Emperor, less seeds, with skin	4	180	Mayonnaise	590	25
jam	7	78	Meat extract, flavored	11,000	6,000
juice, Concord, sweetened, bottled	1	120	*Milk*		
Thompson Seedless, with skin	4	180	cow's		
Tokay, less seeds, with skin	0.7	160	buttermilk, cultured	130	140
Grapefruit			condensed, sweetened	140	340
fresh	0.5	200	evaporated	100	270
juice, sweetened, canned	0.4	150	fat	0.4	0.3
sections, sweetened, frozen	5	60	skim	52	150
Grape Nuts cereal	660	230	whole		
Gravy flavoring, Kitchen Bouquet	86	280	dry	410	1,100
Gum, chewing, spearmint	22	27	liquid	50	140
Halibut			goat's	34	180
raw	56	540	human		
steak, frozen	460	500	from 10 mothers, 3–10 days postpartum	37	68
Ham, raw	1,100	340	from 4 mothers, 49–77 days postpartum	11	51
Hash, corned beef, canned	540	200	low-sodium—*see* Lonalac		
Hazelnuts—*see* Filberts			malted, dry	440	720
Heart			Molasses, cane	80	1,500
beef	90	160	Muffets cereal	4	300
turkey	69	240	Mulberry	0.7	200
Hominy, canned	250	22	*Mushrooms*		
Honey	7	10	canned	400	150
Horse radish, prepared	96	290	raw	5	520
Ice cream	100	90	*Mustard*		
Jam, grape	7	78	greens	48	450
Kale, leaves and midribs	110	410	powder	3	840
Kidney, beef	210	310	prepared paste	1,300	130
Kumquat, pulp and rind, less seeds	7	230	Nectarine, less skin	2	320
Lactalbumin	47	69	Nutmeg	14	160
Lactose, U S P	2	0	Oats, rolled (oatmeal), dry	2	340
Lamb			Okra, fresh	1	220
chop, lean, raw	98	340	Oleomargarine	1,100	58
leg, lean, raw	78	380	*Olives*		
Lard	0.3	0.2	green, pickled	2,400	55
Lemon lime soda	7	33	oil	0.2	0.2
Lemons			ripe, pickled	980	23
peel			stuffed, pickled	2,800	55
candied	50	12	Onions, less tops and dry skins	1	130
fresh	9	360	Orange Crush	2	100
pulp and juice	0.7	130	*Oranges*		
Lentils, dry	3	1,200	juice, unsweetened, canned	0.5	190
Lettuce			pulp and juice	0.3	170
head	12	140	Temple, pulp and juice	3	220
leaf	7	230	Oyster, raw	73	110
Lime, pulp and juice	1	100	Pablena cereal, dry	640	340
Litchi, dried	3	1,100	Pablum cereal, dry	620	340
			Pancreas, pig, raw	57	240
			Paprika	81	2,300
			Parsley, fresh	23	830

TABLE 45—*Continued*

Food	Sodium	Potassium
frozen in syrup	3	[illegible]
raw, less skin	0 5	160
Peanuts:		
butter	120	820
oil	0 2	0 1
raw, with skin	2	720
roasted		
dry, with skin	2	740
in oil and salted, with skin	460	700
Pears:		
Bartlett		
canned in syrup	8	52
raw, less skin and core	2	100
Peas:		
canned, less liquor	270	96
dry, split	42	880
fresh	1	370
frozen	100	160
Pecan, raw	0 3	420
Pectin solution, Certo	15	110
Pepper (spice):		
black	16	880
red	46	2,400
white	5	48
Peppermint extract	0 3	5
Peppers, green, empty pods	0 6	170
Pepsi-Cola	15	3
Persimmon, wild	0 6	310
Pettijohn's cereal, dry	2	380
Pickle, dill	1,400	200
Pilchard—*see* Sardine		
Pineapple:		
canned in syrup	1	120
frozen in syrup	1	38
juice, unsweetened, canned	0 5	140
raw	0 3	210
Plums:		
canned in syrup	18	110
raw	0 6	170
Polyvitamin dispersion, Mead's, dry	6	10
Pomegranate, pulp and juice	0 3	200
Popcorn:		
popped		
oiled	3	240
oiled and salted	2,000	240
Pork:		
lean, raw	58	260
salt	1,800	27
Postum:		
cereal beverage, dry	36	1,300
Instant, dry	71	2,100
Potatoes:		
chips	340	880
sweet		
canned	48	200
raw, less skin	4	530
white		
canned	350	240
raw, less skin	0 8	410
Poultry seasoning	26	840
Pretzel	1,700	130
Protenum, dry	360	1,100
Prunes:		
canned in syrup	3	220
dried	6	600
juice, unsweetened, bottled	2	260
raw, with skin	0 7	210
[illegible]	[illegible]	[illegible]
Quince, less skin and core, raw	0 7	290
Rabbit, domesticated, raw		
foreleg	47	370
loin	34	400
Radish, with skin	9	260
Raisin:		
seedless	21	720
Zante	22	730
Ralston cereal, Instant, dry	1	360
Raspberries:		
black	0 3	190
oriental (wineberry)	0 9	170
red	0 5	130
Rennet tablets, Junket	38,000	36
Rhubarb:		
frozen in syrup	2	160
raw	2	70
Rice, dry		
brown	9	150
flakes	720	180
polished and coated	2	130
puffed	0 9	100
vitaminized	4	170
wild (*Zizania*)	7	220
Root beer	8	0 5
Royal Crown Cola	5	2
Rum	2	3
Rutabaga (yellow turnip), less skin and tops, raw	5	260
Ry-Krisp	1,500	600
Sage	20	670
Salmon:		
canned	540	300
raw	48	410
Salt—theoretical value for pure NaCl	39,342	0
Sardines:		
herring, canned in oil	510	560
pilchard		
canned in natural sauce	760	260
canned in tomato sauce	400	320
Sauerkraut, canned	630	140
Sausage		
Bologna	1,300	230
frankfurter	1,100	220
pork	740	140
Scallop, frozen	130	420
Shortening, vegetable		
Crisco	4	0
Spry	0 4	0 3
Shrimp, raw	140	220
Soda, baking—theoretical value for pure $NaHCO_3$	27,373	0
Soft drinks		
carbonated water		
Canada Dry	18	0 6
made with Sparklet carbon dioxide capsule and distilled water	0	0
White Rock	2	0 6
Coca-Cola	1	52
ginger ale	8	0 6
lemon-lime soda	7	33
Orange Crush	2	100
Pepsi-Cola	15	3
Royal Crown Cola	5	2
root beer	8	0 5
Sorghum syrup	21	600

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
Soup		
beef, canned, diluted as served	410	100
tomato, canned, diluted as served	380	110
vegetable, canned, diluted as served	380	120
Soybeans:		
dry	4	1,900
flour, solvent-extracted	1	1,700
Spaghetti—*see* Macaroni		
Spinach		
canned	320	260
frozen	60	380
raw	82	780
Spry (vegetable shortening)	0.4	0.2
Squash, raw		
acorn, less rind and seeds	0.4	260
Hubbard, less rind and seeds	0.3	240
white summer, less rind, with seeds	0.2	150
yellow summer, less rind, with seeds	0.6	200
Squash, cooked, frozen	6	120
Starch, corn	4	4
Strawberries		
frozen, sweetened	2	180
raw	0.8	180
Sugar		
light brown	24	230
white	0.3	0.5
Sweetbreads—*see* Pancreas, Thymus		
Syrup		
chocolate, Hershey	60	130
maple	14	130
sorghum	21	600
table, corn-and-cane, Karo Crystal White	68	4
Tangerines:		
juice, sweetened, canned	0.6	170
pulp and juice	2	110
Tapioca, dry	5	19
Tea, India-Ceylon-Java blend, dry	4	1,800
Thyme	38	500
Thymus, beef, raw	96	360
Tobacco, chewing, Spark Plug	1,600	1,800
Tomatoes		
canned	18	130
catchup	1,300	800
juice, canned	230	230
raw, with skin	3	230
Tongue, beef, raw	100	260
Tripe, pickled	46	19
Tuna, canned	800	240
Turkey, raw:		
breast meat	40	320
leg meat	92	310
Turmeric	22	2,700
Turnips, raw		
leaves	10	440
white, less skin and tops	37	230
yellow (rutabaga), less skin and tops	5	260
Vanilla extract	1	74
Veal, lean, raw	48	330
Vinegar		
cider	1	100
distilled	0.6	15
Walnuts, raw		
black	3	460
English	2	450
Water, carbonated—*see* Soft drinks		
Watermelon, pink part of fruit	0.3	110
Wheat		
beeswing (outermost coats)	4	360
bran, crude	15	980
flakes cereal	1,300	320
germ		
crude	2	780
malt-flavored, Zing	9	780
gluten	2	24
puffed	4	340
scourings (dirt and fragments)	8	470
shredded	2	330
winter, scoured—4 samples	2	370
Wheatena cereal, dry	2	380
Whiskey		
blended	0.3	1
bonded	0.1	0.6
Wild rice (*Zizania*), dry	7	220
Wine		
port	4	75
sauterne	10	87
Wineberry (oriental raspberry)	0.9	170
Worcestershire sauce	2,100	480
Yeast		
compressed	4	360
debittered brewers', dry	150	1,700
primary cultured, dry—19 samples		
maximum	320	2,200
minimum	9	1,700
average	115	1,860
Zwieback	250	150

TABLE 46

Sodium and Potassium Content of Public Water Supplies

Place	Sodium (Mg/100 Cc)	Potassium (Mg/100 Cc)	Place	Sodium (Mg/100 Cc)	Potassium (Mg/100 Cc)
Aberdeen, S.D.	20	2	Frankfort, Ky.	0.3	0.1
Albany, N Y	0.2	0.2	Galesburg, Ill.	30	2
Albuquerque, N.M.	5	0.7	Galveston, Texas	34	0.7
Allentown, Pa.	0.4	0.3	Grand Forks, N.D.	6	0.4
Annapolis, Md	0.2	0.2	Hamilton, Ohio	3	0.2
Ann Arbor, Mich.	2	0.5	Harrisburg, Pa.	0.2	0.1
Atlanta, Ga.	0.2	0.2	Hartford, Conn.	0.2	0.1
Augusta, Me.	0.2	0.2	Helena, Mont.	0.3	0.2
Austin, Texas	3	0.5	Houston, Texas	16	0.6
Baltimore, Md.	0.3	0.2	Huntington, W.Va.	3	0.2
Bangor, Me.	0.2	0.1	Independence, Mo.	9	0.5
Baton Rouge, La	9	0.2	Indianapolis, Ind.	1	0.3
Beloit, Wis.	0.5	0.2	Iowa City, Iowa	0.5	0.3
Billings, Mont.	1	0.2	Jackson, Mich.	5	0.3
Biloxi, Miss.	23	0.6	Jackson, Miss.	0.4	0.2
Birmingham, Ala	2	0.3	Jacksonville, Fla.	1	0.2
Bismarck, N.D.	6	0.6	Jefferson City, Mo.	3	0.4
Boise, Idaho	2	0.3	Jersey City, N.J.	0.3	0.2
Boston, Mass.	0.3	0.2	Joplin, Mo.	0.5	0.1
Brownsville, Texas	6	0.3	Kalamazoo, Mich.	0.7	0.3
Brownwood, Texas.	2	0.4	Kansas City, Kan.	4	0.4
Buffalo, N Y.	0.7	0.3	Kansas City, Mo.	10	3
Burlington, Vt.	0.2	0.1	Lancaster, Pa.	0.4	0.1
Butte, Mont.	0.6	0.4	Lansing, Mich.	1	0.5
Camden, N.J.	0.9	0.3	Lawrence, Kan.	4	0.7
Carson City, Nev.	0.4	0.3	Lincoln, Neb.	3	0.7
Charleston, S C	1	0.3	*Little Rock, Ark.*	0.1	0.1
Charleston, W Va	0.3	0.2	Los Angeles, Calif.		
Charlotte, N.C.	0.3	0.1	Aqueduct source	6	0.6
Charlottesville, Va.	0.2	0.1	Metropolitan source	17	0.5
Cheyenne, Wyo.	0.3	0.2	River source	5	0.5
Chicago, Ill	0.3	0.1	Louisville, Ky.	2	0.3
Cincinnati, Ohio	0.7	0.3	Madison, Wis.	0.4	0.2
Cleveland, Ohio	1	0.3	Manchester, N.H.	0.2	0.1
Columbia, S C.	0.4	0.2	Marion, Ohio	17	0.7
Columbus, Ohio	5	0.6	Memphis, Tenn.	2	0.3
Concord, N.H	0.2	0.1	Miami, Fla.	2	0.3
Corpus Christi, Texas	15	0.6	Middletown, Ohio	0.8	0.1
Crandall, Texas	170*	0.5	Milwaukee, Wis.	0.3	0.1
Dallas, Texas	3	0.5	Minneapolis, Minn.	0.5	0.3
Dayton, Ohio	0.7	0.2	Minot, N.D.	25	0.6
Denver, Colo	3	0.2	Moberly, Mo.	0.3	0.2
Des Moines, Iowa	1	0.4	Montgomery, Ala.	0.8	0.1
Detroit, Mich	0.3	0.1	Montpelier, Vt.	0.1	0.1
Dover, Del	2	0.5	Nashville, Tenn	0.3	0.2
Durham, N C.	0.4	0.2	Newark, N J.	0.2	0.1
El Paso, Texas	7	0.6	New Haven, Conn.	0.3	0.1
Emporia, Kan.	1	0.3	New Orleans, La	1	0.4
Eureka, Calif.	0.7	0.6	New York, N Y.	0.3	0.2
Evansville, Ind.	2	0.5	Oakland, Calif.	0.3	0.1
Fargo, N.D	5	0.7	Oklahoma City, Okla	10	0.8
Flint, Mich.	2	0.2	Olympia, Wash.	0.5	0.3

* An extreme example This water is rarely drunk, but is used for cooking

TABLE 46—*Continued*

Place	Sodium (Mg/100 Cc)	Potassium (Mg/100 Cc)	Place	Sodium (Mg/100 Cc)	Potassium (Mg/100 Cc)
Omaha, Neb	8	1	San Francisco, Calif...	1	0.3
Philadelphia, Pa....	2	0.4	Santa Barbara, Calif.	10	0.3
Phoenix, Ariz	11	0.7	Seattle, Wash	0.2	0.1
Pierre, S.D	9	0.5	Sedalia, Mo.	0.3	0.2
Pittsburgh, Pa	6	0.5	Shreveport, La	2	0.1
Portland, Me....	0.2	0.1	Sioux Falls, S D.	1	0.4
Portland, Ore	0.1	0.1	Springfield, Ill	0.8	0.3
Providence, R.I..	0.2	0.1	Springfield, Mo.	0.4	0.2
Raleigh, N.C....	0.4	0.1	Syracuse, N.Y.	0.2	0.1
Reno, Nev.......	0.5	0.1	Tallahassee, Fla.	0.3	0.1
Richmond, Va....	0.7	0.2	Tampa, Fla.	0.5	0.1
Rochester, Minn.	0.7	0.2	Texarkana, Ark	3	0.2
Rochester, N.Y..	0.3	0.2	Topeka, Kan .	1	0.5
Rockford, Ill ...	0.7	0.2	Trenton, N J.	0.1	0.1
Sacramento, Calif. .	0.3	0.2	Tucson, Ariz	3	0.3
Santa Fe, N M.	0.4	0.1	Tulsa, Okla	0.3	0.4
St. Joseph, Mo...	9	0.6	Uniontown, Pa	0.2	0.1
St. Louis, Mo.	5	0.5	Upper Darby, Pa	0.4	0.2
St. Paul, Minn.	0.5	0.3	Washington, D C	0.3	0.3
St. Petersburg, Fla .	0.5	0.1	Whittier, Calif.	1	0.2
Salem, Ore	0.2	0.1	Wichita, Kan	5	0.5
Salt Lake City, Utah	0.8	0.2	Wilkes-Barre, Pa	0.2	0.1
San Angelo, Texas	5	0.9	Wilmington, Del	0.8	0.1
San Antonio, Texas	1	0.1	Winona, Minn	5	0.4
San Diego, Calif .	5	0.5			

Mineral Elements and Excess of Acidity or Alkalinity

TABLE 47

Mineral Elements* and Excess of Acidity or Alkalinity† per 100 Gm. of Foods, Edible Portion

Food	Minerals					Excess‡	
	Magnesium (Gm.)	Potassium (Gm.)	Sodium (Gm.)	Chlorine (Gm.)	Sulphur (Gm.)	Acidity (Cc. of N Acid HCl)	Alkalinity (Cc. of N Alkali NaOH)
Almonds	0.275	0.756	0.024	0.037	0.164	2.2	12.0–18.3
Apples:							
fresh	0.006	0.116	0.015	0.004	0.004	....	0.8–3.7
dried	0.029	0.557	0.072	0.019	0.019	....	....
Apricots:							
fresh	0.012	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
dried	0.062	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Asparagus	0.015	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bananas	0.024	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Barley, entire	0.126	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Beans:							
dried	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bee[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cabbage	0.016	0.217	0.038	0.034	0.074	....	1.4–8.2
celery	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	....
[illegible]							7.5
[illegible]							4.4–10.8
[illegible]							1.4–5.3
[illegible]							2.5–11.1
[illegible]							3.6–5.1
[illegible]							1.7–7.3
[illegible]							7.4–11.3
[illegible]							....
[illegible]							7.9
[illegible]							0.7
[illegible]							4.1–7.0
Collards	0.017	....	....	....	....	....	....
Corn:							
field, mature	0.142	0.300	0.110	0.041	0.124	....	....
sweet	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cucumbers	0.010	0.170	0.010	[illegible]	0.011	....	[illegible]

* W. H. Peterson, J. T. Skinner, and F. M. Strong, Elements of food biochemistry (New York: Prentice-Hall, Inc., 1944), pp. 262–65

† M. A. Bridges and M. R. Mattice, Food and beverage analyses (Philadelphia: Lea & Febiger, 1942), pp. 200–214

‡ The ranges indicated come from reports of several authors, in which variety and method of preparation influence the results in part. For individual studies and sources of data see Bridges and Mattice, *op. cit.*

§ Variable.

‖ Partly acid *in vivo*

Food	Minerals					Excess†	
	Magnesium (Gm.)	Potassium (Gm.)	Sodium (Gm.)	Chlorine (Gm.)	Sulphur (Gm.)	Acidity (Cc. of N Acid HCl)	Alkalinity (Cc. of N Alkali NaOH)
Currants,							
fresh	0.031	0 208	0 015	0 010	0.021	...	0.7-8.8
dried	0 155	1.040	0 075	0 050	0.105	...	5 8-21.8
Dates	0.065	0 580	0 040	0 253	0 048	...	5.5-12.4
Eel	0 018	0 241	0 032	0 035	0.133	7 0-9.9	...
Eggplant	0.015	0.260	0 026	0.063	0 020	...	4 5
[illegible]	[illegible]	[illegible]	[illegible]	0.100	0 233	11 1-24.5	...
[illegible]	[illegible]	[illegible]	[illegible]	0 131	0 211	4 8-8 3	...
[illegible]	[illegible]	[illegible]	[illegible]	0 067	0 214	25 3-51 8	...
[illegible]							
fresh	0 020	0.205	0.043	0 037	0 017	...	...
dried	0 068	0 709	0 151	0.126	0 060	...	10 0-100 9
Fish (all kinds)	0 024	0.375	0 064	0 137	0 199	8 5-20 1	...
Flour, wheat, white	0 021	0 137	0 053	0 079	0 155	7 4-9 6	...
Frog	0 024	0 308	0 055	0 040	0 163	10 6-15 8	...
Garlic	0 008	0 130	0 009	0 004	0 318	...	...
Goose	0 031	0 406			0 326	7 7-24 5	...
Gooseberries	0 009	0 150	0 010	0.009	0 015	...	2.1-7.6
Grapefruit	0 007	0 164	0 006	0 007	0 005	...	6 4
Grapes	0 004	0 267	0 011	0 002	0 009	...	2 7-7.2
Haddock	0 017	0 334	0 099	0 241	0 225	8 5-19 7	...
Heart	0 035	0 329	0 102	0 204	0 151	27 6	...
Honey	0 004	0 051	0 006	0 015	0 003	1 1	0 4-4.6
Horse-radish	0 028	0 550	0 094	0 013	0 234	...	2 7-5.8
Kale	0 055	0 486	0 050	0 120	0 260	...	4 0-17.0
Kidney	0 019	0 240	0 238	0 376	0 148	8 4-31 0	...
Kohlrabi	0 052	0 370	0 050	0 050	0 039	...	6 0
Lamb (*see* Mutton)							
Leeks	0 037	0 380	0 036	0 110	0 056	...	5 5-11 3
Lemons	0 006	0 152	0 009	0 006	0 012	...	5.5-9 9
Lentils, dried	0 082	0 662	0 754	0 062	0 123	5 2-17 8	0 4-2 0
Lettuce	0 015	0 256	0 028	0 085	0 014	...	3 8-14 1
Liver	0 021	0 255	0 021	0 091	0 258	9 4-49 5	...
Lobster	0 022	0 258			...	38 4	...
Macaroni, dry	0 038	0 054	0 010	0 077	0 119	3 8-9 6	...
Milk							
cow							
fresh	0 019	0 129	0 047	0 114	0 031	...	1 8-4.2
evaporated	0 038	0 258	0 094	0 228	0 067	...	4.6
powder	0.118	0 955	0 348	1 029	0 229	...	21 6
goat		...	0 026	0 163		...	...
human	0 005	0 055	...	0 058	0 142	...	...
Mushrooms	0 012	0 280	0 013	0 026	0 025	...	1 8-4.0
Mustard greens	0 016	0 330	0 020	0 090	0 142	...	...
Mutton	0 033	0.260	0 070	0 069	0 187	4 5-22.5	...
Oatmeal (rolled oats)	0 143	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oats, entire	0 150	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Onions	0 016	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Orange juice	0.014	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oranges	0 011	0 177	0 014	[illegible]	0 011	...	5.6 9 0
Parsnips	0 038	0 396	0 010	0 038	0 025	...	0 6-11.9

TABLE 47—*Continued*

Food	Minerals					Excess‡	
	Magnesium (Gm.)	Potassium (Gm.)	Sodium (Gm.)	Chlorine (Gm.)	Sulphur (Gm.)	Acidity (Cc. of N Acid HCl)	Alkalinity (Cc. of N Alkali NaOH)
Peaches:							
fresh	0.015	0.174	0.012	0.006	0.005	....	3.8–6.1
dried	0.087	1.009	0.070	0.035	0.029	....	4.1–12.1
Peanuts	0.169	0.706	0.052	0.040	0.276	3.9–16.4	....
Pears	0.005	0.110	0.010	0.004	0.010	....	1.5–3.6
Peas:							
green	0.035	0.259	0.024	0.049	0.035	1.4–2.9	1.2–5.2
mature	0.121	0.943	0.072	0.034	0.178	0.5–3.4	1.2–10.3
Peppers:							
green	0.025	0.270	0.015	0.031	0.030	....	....
red	0.013	0.120	0.006	0.014	0.030	....	....
Persimmons	0.005	0.170	0.013	0.009	0.011	....	....
Pike	0.031	0.416	0.029	0.032	0.218	2.8–19.5	....
Pineapple	0.014	0.230	0.008	0.038	0.003	....	2.2–7.00
Plums	0.010	0.212	0.003	0.002	0.004	....	4.8‖
Pork	0.027	0.415	0.081	0.040	0.216	7.7–28.6	....
Potatoes	0.027	0.498	0.030	0.048	0.033	....	7.0–12.8
Prunes, dried	0.032	0.845	0.101	0.004	0.024	....	7.8–20.3‖
Pumpkins	0.021	0.198	0.011	0.025	0.016	....	0.3–7.8
Rabbit	0.029	0.415	0.047	0.051	0.184	14.8–22.4	....
Radishes	0.014	0.166	0.083	0.056	0.038	....	2.9–7.2
Raisins	0.017	0.796	0.120	0.068	0.043	....	23.7–27.0
Raspberries	0.018	0.141	0.007	0.010	0.012	....	4.1–6.1
Rhubarb	0.015	0.392	0.010	0.070	0.008	....	8.6–13.0
Rice:							
entire	0.141	0.334	0.068	0.066	0.121	....	....
polished	0.033	0.046	0.012	0.056	0.114	2.5–9.0	....
Rutabagas	0.015	0.210	0.052	0.031	0.069	....	8.5
Rye, entire	0.136	0.477	0.060	0.043	0.152	11.3	....
Sardines, fresh	0.035	....	....	....	....	11.4–26.5	....
Shrimps:							
dried		....	....	....	....	....	....
salted	0.327	0.760	§	§	0.183	1.6	....
Soybeans, mature	0.287	1.693	0.280	0.007	0.269	....	....
Spaghetti (*see* Macaroni)							
Spinach	0.048	0.416	0.093	0.118	0.027	....	5.1–39.6
Squash	0.006	0.161	0.011	0.018	0.029	....	2.8
Strawberries	0.019	0.205	....	....	0.013	....	1.8–3.5
Sugar beets	0.041	0.440	0.130	0.180	0.021	....	3.3–9.4
Sweet potatoes	0.035	0.381	0.031	0.022	0.014	....	5.0–7.9
Tomatoes	0.016	0.277	0.013	0.048	0.017	....	5.6–13.7
Turkey	0.028	0.367	0.130	0.123	0.234	10.4–19.5	....
Turnip greens	0.079	0.300	0.260	0.390	0.051	....	2.3
Turnips	0.019	0.193	0.104	0.054	0.048	....	2.7–10.2
Veal	0.030	0.380	0.086	0.073	0.199	9.8–28.5	....
Venison	0.029	0.336	0.070	0.041	0.211	23.8	....
Walnuts	0.132	0.606	0.013	0.030	0.120	7.9–9.2	....
Watercress	0.010	0.100	0.031	0.059	0.071	....	....
Watermelon	0.006	0.071	0.012	0.006	0.005	....	1.8–2.7
Wheat:							
entire	0.163	0.409	0.106	0.088	0.175	9.7–12.0	....
bran	0.420	1.252	0.007	0.042	0.245	....	....
Yams	0.015	0.290	0.015	0.037	0.013	....	....

APPENDIX 9

Weight and Height Tables

TABLE 48

Desirable Weights for Men
(Ages Twenty five and Over)

Height (With Shoes)		Weight in Pounds (As Ordinarily Dressed)		
		Small Frame	Medium Frame	Large Frame
Feet	Inches			
5	2	116–25	124–33	131–42
5	3	119–28	127–36	133–44
5	4	122–32	130–40	137–49
5	5	126–36	134–44	141–53
5	6	129–39	137–47	145–57
5	7	133–43	141–51	149–62
5	8	136–47	145–56	153–66
5	9	140–51	149–60	157–70
5	10	144–55	153–64	161–75
5	11	148–59	157–68	165–80
6	0	152–64	161–73	169–85
6	1	157–69	166–78	174–90
6	2	163–75	171–84	179–96
6	3	168–80	176–89	184–202

* Figures from Metropolitan Life Insurance Company, Statistical Bureau, 1943

TABLE 49

Desirable Weights for Women
(Ages Twenty-five and Over)

Height (With Shoes)		Weight in Pounds (As Ordinarily Dressed)		
		Small Frame	Medium Frame	Large Frame
Feet	Inches			
4	11	104–11	110–18	117–27
5	0	105–13	112–20	119–29
5	1	107–15	114–22	121–31
5	2	110–18	117–25	124–35
5	3	113–21	120–28	127–38
5	4	116–25	124–32	131–42
5	5	119–28	127–35	133–45
5	6	123–32	130–40	138–50
5	7	126–36	134–44	142–54
5	8	129–39	137–47	145–58
5	9	133–43	141–51	149–61
5	10	136–47	145–55	152–66
5	11	139–50	148–58	155–69

* Figures from Metropolitan Life Insurance Company, Statistical Bureau, 1943

TABLE 50*

Average Weight for Height Tables

for girls from birth to school age†

Height (In.)	Average Weight in Pounds											
	1 Mo.	3 Mo.	6 Mo.	9 Mo	12 Mo	18 Mo.	24 Mo	30 Mo.	36 Mo.	48 Mo.	60 Mo.	72 Mo.
20	8											
21	9	10										
22	10	11										
23	11	12	13									
24	12	13	14	14								
25	13	14	15	15								
26		15	16	17	17							
27		16	17	18	18							
28			19	19	19	19						
29			19	20	20	20						
30			21	21	21	21	21					
31				22	22	23	23	23				
32					23	24	24	24	25			
33						25	25	25	26			
34						26	26	26	27			
35						29	29	29	29	29		
36							30	30	30	30	31	
37							31	31	31	31	32	
38								33	33	33	33	
39								34	34	34	34	34
40									35	36	36	36
41										37	37	37
42										39	39	39
43										40	41	41
44											42	42
45												45
46												47
47												50
48												52

* Figures from Metropolitan Life Insurance Company

† Prepared by Robert M. Woodbury, Ph.D., Children's Bureau, Federal Security Agency

TABLE 50—*Continued*

FOR BOYS FROM BIRTH TO SCHOOL AGE†

Height (In.)	Average Weight in Pounds											
	1 Mo.	3 Mo.	6 Mo.	9 Mo.	12 Mo.	18 Mo.	24 Mo.	30 Mo.	36 Mo.	48 Mo.	60 Mo.	72 Mo.
20	8											
21	9	10										
22	10	11										
23	11	12	13									
24	12	13	14									
25	13	14	15	16								
26		15	17	17	18							
27		16	18	18	19							
28			19	19	20	20						
29			20	21	21	21						
30			22	22	22	22	22					
31				23	23	23	23	24				
32				24	24	24	25	25				
33					26	26	26	26	26			
34						27	27	27	27			
35						29	29	29	29	29		
36							30	31	31	31		
37							32	32	32	32	32	
38								33	33	33	34	
39								35	35	35	35	
40									36	36	36	36
41										38	38	38
42										39	39	39
43										41	41	41
44											43	43
45											45	45
46												48
47												50
48												52
49												55

TABLE 50—*Continued*

FOR GIRLS FROM FIVE TO EIGHTEEN YEARS‡

Height (In.)	Average Weight in Pounds													
	5 Yr.	6 Yr.	7 Yr.	8 Yr.	9 Yr.	10 Yr.	11 Yr.	12 Yr.	13 Yr.	14 Yr.	15 Yr	16 Yr	17 Yr	18 Yr.
38	33	33												
39	34	34												
40	36	36	36											
41	37	37	37											
42	39	39	39											
43	41	41	41	41										
44	42	42	42	42										
45	45	45	45	45	45									
46	47	47	47	48	48									
47	49	50	50	50	50	50								
48		52	52	52	52	53	53							
49		54	54	55	55	56	56							
50		56	56	57	58	59	61	62						
51			59	60	61	61	63	65						
52			63	64	64	64	65	67						
53			66	67	67	68	68	69	71					
54				69	70	70	71	71	73					
55				72	74	74	74	75	77	78				
56					76	78	78	79	81	83				
57					80	82	82	82	84	88	92			
58						84	86	86	88	93	96	101		
59						87	90	90	92	96	100	103	104	
60						91	95	95	97	101	105	108	109	111
61							99	100	101	105	108	112	113	116
62							104	105	106	109	113	115	117	118
63								110	110	112	116	117	119	120
64								114	115	117	119	120	122	123
65								118	120	121	122	123	125	126
66									124	124	125	128	129	130
67									128	130	131	133	133	135
68									131	133	135	136	138	138
69										135	137	138	140	142
70										136	138	140	142	144
71										138	140	142	144	145

‡ Prepared by Bird T Baldwin, Ph D , and Thomas D Wood, M.D.

TABLE 50—*Continued*

FOR BOYS FROM FIVE TO NINETEEN YEARS‡

Height (In.)	Average Weight in Pounds														
	5 Yr.	6 Yr.	7 Yr.	8 Yr.	9 Yr.	10 Yr.	11 Yr.	12 Yr.	13 Yr.	14 Yr.	15 Yr.	16 Yr.	17 Yr.	18 Yr.	19 Yr.
38	34	34													
39	35	35													
40	36	36													
41	38	38	38												
42	39	39	39	39											
43	41	41	41	41											
44	44	44	44	44											
45	46	46	46	46	46										
46	47	48	48	48	48										
47	49	50	50	50	50	50									
48		52	53	53	53	53									
49		55	55	55	55	55	55								
50		57	58	58	58	58	58	58							
51			61	61	61	61	61	61							
52			63	64	64	64	64	64	64						
53			66	67	67	67	67	68	68						
54				70	70	70	70	71	71	72					
55				72	72	73	73	74	74	74					
56				75	76	77	77	77	78	78	80				
57					79	80	81	81	82	83	83				
58					83	84	84	85	85	86	87				
59						87	88	89	89	90	90	90			
60						91	92	92	93	94	95	96			
61							95	96	97	99	100	103	106		
62							100	101	102	103	104	107	111	116	
63							105	106	107	108	110	113	118	123	127
64								109	111	113	115	117	121	126	130
65								114	117	118	120	122	127	131	134
66									119	122	125	128	132	136	139
67									124	128	130	134	136	139	142
68										134	134	137	141	143	147
69										137	139	143	146	149	152
70										143	144	145	148	151	155
71										148	150	151	152	154	159
72											153	155	156	158	163
73											157	160	162	164	167
74											160	164	168	170	171

APPENDIX 10

Energy Expenditure

Passmore and Durnin (1) have compiled more than five hundred values representing energy expenditures while carrying out personal necessities: sitting and walking at different speeds; during children's recreation; light indoor recreation of adults; domestic work; mental work; office work; during such "moderate" exercise as canoeing, horseback riding, cycling; during "heavy" exercise,

TABLE 51

Daily Energy Expenditure of the Reference Man and Woman (2)
(Mean Annual Temperature 10° C.)

			Calories
	Man, 65 Kg.		
A.	[illegible]		1,200
B.	[illegible]		1,500
C.	[illegible]		500
	Total		3,200
	Woman, 55 Kg.		
A.	[illegible]		880
B.	[illegible]	150	
	[illegible]	220	
	[illegible]	420	
	[illegible]	210	1,000
C.	[illegible]		420
	Total		2,300

such as football, swimming, skiing, cross-country running, fishing; in various types of light and heavy industry, agriculture, lumber work, and the various activities of soldiers.

The unit used in expressing energy expenditure is in terms of the *total* energy expenditure in calories per minute rather than in *net* energy expenditure above basal calories. This unit has been

recommended by the Committee on Calorie Requirements of the Food and Agriculture Organization in 1957 (2). Table 51 presents an example of how the energy expenditure may be distributed during the day.

REFERENCES

1. PASSMORE, R., and DURNIN, J. V. G. A Human energy expenditure, Physiol. Rev., 34:801–40, 1955.
2. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Calorie requirements. ("FAO Nutritional Studies," No. 15) Rome, 1957.

than after doctors and diseases. Official use was made of this "Glossary of Dietetic Terms" in the first edition of the *Handbook of Diet Therapy* compiled for The American Dietetic Association in 1946 (5). Diets were named, defined, and described as set forth in this Glossary.

By 1948 rapid strides in diet therapy brought members to the realization that corrections of inaccuracies, deletions, and additions were in order. Dr. Hazel Hauck as chairman and Dr. Helen Pilcher and Beatrice Finkelstein took the matter in hand, making extensive changes to bring the Glossary more closely in line with the newer findings in nutrition and the wishes of the members. At this time the committee stated:

> In general the terms selected for inclusion in the Glossary of Dietetic Terms fall into the following categories: terms relating to the field of dietetics or the work of the dietitian; therapeutic diets; nutrients, or classes of nutrients required by man or thought to be useful in the human dietary; terms used in describing diets or foods, or relating to food composition; diseases associated with dietary deficiency or conditioned malnutrition; and some terms relating to digestion. The reader should consult a medical dictionary and appropriate texts for terms which are outside the scope of this glossary.

This revision was completed in 1950 and was used in naming and describing diets in the revised edition of the *Handbook of Diet Therapy* in 1952 (6). The complete Glossary appeared in this edition.

In 1956, members were again ready to reconsider the content of the Glossary. Under the chairmanship of Lorraine Weng, a committee of the Diet Therapy Section solicited recommendations from the state diet therapy sections regarding revisions in the *Handbook*. In response to a question, "Do you use the Glossary of Dietetic Terms in naming and defining diets in your hospital manual?" approximately 70 per cent replied that they used it in some degree; 30 per cent that they did not.

Since the purpose of the Glossary is to provide aid in the naming and description of diets as well as in the use of other related terminology in diet manuals, recommendations from this committee have been included in the Glossary. In addition, recent findings relating to the chemical structure and function of certain nutrients have been incorporated from the National Academy of Science-National Research Council Publication No. 589 (1958). However, the guide lines established in 1950 have been retained.

REFERENCES

1. WALLER, D. S Report of Diet Therapy Section chairman, J. Am. Dietet. A, 7:292, 1931.
2. Digest of committee reports, Diet Therapy Section. *In* American Dietetic Association Reports for 1931–32, J. Am. Dietet. A., Suppl. 8, p. 21, 1933.
3. Committee reports, Diet Therapy Section. *In* Annual Reports, 1939–40, and Proceedings New York meeting, J. Am. Dietet A, 16:1015, 1940.
4. Committee report, Diet Therapy Section. *In* Annual Reports, 1940–41, and Proceedings St. Louis meeting, J. Am. Dietet. A., 17:999, 1941.
5. Glossary of dietetic terms. *In* TURNER, D. Handbook of diet therapy. Chicago: University of Chicago Press, 1946
6. Revised glossary of dietetic terms. *In* TURNER, D. Handbook of diet therapy. 2d ed. Chicago: University of Chicago Press, 1952.

GLOSSARY OF DIETETIC TERMS, REVISED, 1958

ACID, ARACHIDONIC—*See* Acids, fatty essential

ACID, ASCORBIC ($C_6H_8O_6$)—A water-soluble vitamin unstable to oxidation; a white crystalline solid with a sour taste, the reduced form in which vitamin C is most commonly found in fresh food: concerned specifically with the maintenance of intercellular substances, including the collagen of fibrous tissue structures, the matrices of bones, cartilage, and dentine, and all non-epithelial cement substance, including that of the vascular endothelium. A deficiency lowers the activity of many cellular and serum enzymes well in advance of gross evidences of scurvy Ascorbic acid also spares several members of the vitamin B complex.

ACID, DEHYDROASCORBIC ($C_6H_6O_6$)—First (reversible) oxidation product obtained from ascorbic acid, found in significant quantities in food which has undergone storage or processing, approximately as active, physiologically, as ascorbic acid.

ACID, FOLIC—*See* Folacin.

ACID, LINOLEIC—*See* Acids, fatty essential

ACID, LINOLENIC—*See* Acids, fatty essential

ACID, NICOTINIC—*See* Niacin.

ACID, PANTOTHENIC ($C_8H_{16}O_4NCOOH$)—A vitamin of the B complex; a constituent of coenzyme A, which is involved in the release of energy from carbohydrate utilization and is necessary for the synthesis and degradation of fatty acids, sterols, and steroid hormones, functions in the acetylation of choline, sulfonamide drugs, and para-aminobenzoic acid and is involved in the formation of porphyrins as well as many other compounds of great importance to the body. Thought to be a dietary essential for man, although proof is not clear-cut A 2,500-calorie mixed diet provides about 10 mg. of pantothenic acid. The pantothenic acid content of foods may be found in Agriculture Handbook No. 97, *Pantothenic Acid in Foods* (U.S. Department of Agriculture, 1956), by E. G. Zook, M. J MacArthur, and E. W. Toepfer, Human Nutrition Research Branch, Agricultural Research Service.

ACID, PARA-AMINOBENZOIC ($NH_2C_6H_4COOH$)—A vitamin of the B complex; part of the folic acid molecule and used by some organisms in the synthesis

of folic acid; usefulness of the compound as such, in the diet of man, not established.

ACID ASH RESIDUE—The inorganic radicals consisting chiefly of chloride, sulfate, and phosphate, which form acid ions (anions) in the body, measured as the amount of tenth-normal alkali required for neutralization.

ACID-FORMING FOODS—Foods in which the acid ash residue exceeds the alkaline ash residue. These include meat, fish, poultry, eggs, cereals, and some nuts Certain fruits, such as cranberries, and some varieties of prunes and plums, although they have a predominantly alkaline residue, are acid-forming because the organic acids in them are not metabolized in the body. Pure starches, sugars, and fats, which produce carbonic acid during metabolism, are not included as "acid-forming" since carbonic acid is readily excreted by the lungs, without affecting alkaline reserve. *See* Acid ash residue

ACIDOSIS—A condition caused by the abnormal accumulation of acids in, or the excessive loss of base from, the body; usually accompanied by a lowered alkaline reserve; for example, diabetic acidosis in which the acids concerned are beta-hydroxybutyric and acetoacetic acids, from incomplete oxidation of fat.

ACIDS, AMINO—*See* Acids, amino essential; Protein.

ACIDS, AMINO, ESSENTIAL—Some twenty-three amino acids are known to be physiologically important. Of these, eight have been demonstrated to be dietary essentials for the adult human, since they are synthesized in inadequate quantity by the body. This group of *essential* amino acids includes isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. Dietary sources of a ninth amino acid, histidine, are probably necessary to maintain growth during childhood. The diet must include adequate sources of the essential amino acids and sufficient other "non-essential" amino acids for maintenance in the adult and growth in children. Requirements for reproduction, lactation, or other special body functions and in disease cannot be stated at present.

Ac [illegible] diet. Thought to be essential for humans.

ALCOHOL—About 70 per cent of the potential energy of alcohol is available to the body, i e , about 5 calories per gram.

ALKALINE ASH RESIDUE—The elements sodium, potassium, calcium, and magnesium, which form basic ions (cations) in the body; measured as the amount of tenth-normal acid required for neutralization.

ALKALINE-FORMING FOODS—Foods in which the alkaline ash residue exceeds the acid ash residue. These include most fruits, vegetables, and milk. *See* Alkaline ash residue.

ALLERGEN—Any substance capable of inducing a condition of allergy or specific [illegible] to a substance (probably protein) in [illegible] in similar amounts for the majority of persons.

ANEMIA—A condition in which the hemoglobin content of the blood is low; red cells may be decreased in number or altered in appearance. Nutritional

anemias may be associated with various dietary deficiencies—for example, deficiencies of iron, protein, ascorbic acid, or folic acid; or they may be conditioned deficiencies, as is the case when hypochlorhydria results in decreased absorption of iron.

ANOREXIA—Lack or loss of appetite for food.

ANTI-PERNICIOUS ANEMIA FACTOR—*See* Extrinsic factor (Castle's); Vitamin B_{12}.

ANTIVITAMIN—Any substance that interferes with the synthesis or metabolism of a vitamin—for example, avidin, which combines with biotin and prevents its absorption; thiaminase in certain raw fish, which destroys thiamine; and sulfanilamide, which interferes with the synthesis of folic acid in the intestinal tract by competing with para-aminobenzoic acid for a place in the molecule

APPETITE—A natural desire for food.

ARIBOFLAVINOSIS—The deficiency disease resulting from lack of riboflavin; frequently associated with deficiencies of other members of the B complex, as in beriberi and pellagra.

AS PURCHASED (A P.)—Refers to food as offered for sale on the retail market. In tables which give nutritive value for food "as purchased," the nutrient content is stated in terms of the weight of the food before inedible portions or portions usually discarded are removed, i.e , the nutritive value of "refuse" is not included *See* Edible portion

ASH—The total mineral matter residue after ignition of a food, always either neutral or alkaline, since acid in excess of that which can be neutralized is volatilized.

AVITAMINOSIS—A disease due to the dietary deficiency of a vitamin or vitamins or to failure of absorption or utilization—for example, scurvy

BASE-FORMING FOODS—*See* Alkaline-forming foods

BERIBERI—A deficiency disease due to a lack of thiamine; endemic in areas in which polished rice is the chief item of the diet.

β-CAROTENE—*See* Carotene.

BIOTIN ($C_{10}H_{16}O_3N_2S$)—A member of the vitamin B complex, essential for the activity of many enzyme systems in bacteria, animals, and presumably man. Through carbon dioxide fixation reactions, it may be involved in the formation of acetoacetate and in the synthesis of fatty acids, such as oleic, which reduce biotin requirements Widely distributed in foods, and intestinal bacteria synthesize it Deficiency states have been recognized in man only when diets have included large amounts of avidin (a glycoprotein in raw egg white). An average American diet contains 150–300 μg of biotin a day, an amount sufficient to maintain the individual in good health.

BULK—*See* Carbohydrate, indigestible, which is the preferred term.

CALCIFEROL ($C_{28}H_{44}O$)—Vitamin D_2, a fat-soluble vitamin, one of several antirachitic factors, irradiated ergosterol. *See* Ergosterol, Vitamin D.

CALORIE (LARGE OR KILO-CALORIE)—The unit used to express food energy; the amount of heat required to raise the temperature of 1 kg of water 1° C.

CARBOHYDRATE, AVAILABLE—This term represents the portion of the carbohydrate of foods available to the human body for glycogen formation It includes starch, dextrin, glycogen, glucose, fructose, galactose, sucrose, lactose, and maltose.

CARBOHYDRATE, INDIGESTIBLE—Substances which make up the cell-wall struc-

ture of plants, consisting of varying amounts of cellulose, hemicellulose, lignin, pectin substances, gums, mucin, etc.; not hydrolyzed by enzymes of the human gastrointestinal tract.

CARBOHYDRATE, TOTAL, BY DIFFERENCE—Solids in foods other than protein, fat, and ash; includes both available and indigestible carbohydrates and some organic acids.

CAROTENE ($C_{40}H_{56}$)—Provitamin A. A yellow-red plant pigment occurring in several forms; β-carotene is the most abundant form in common green leafy and yellow vegetables.

CELLULOSE $(C_6H_{10}O_5)_n$—*A polysaccharide made up of beta-glucose units;* constituent of the cell walls of plants. *See* Carbohydrate, indigestible; Fiber, crude.

CHOLESTEROL ($C_{27}H_{45}OH$)—A fatlike substance found in animal tissues (see Tables 39, 40, 41, 42); may be synthesized in the body; excreted in bile but largely reabsorbed from the digestive tract in the presence of fat. A constituent of gallstones and atheroma of the arteries.

CHOLINE ($C_5H_{15}O_2N$)—A component of lecithin and acetylcholine; often considered a member of the vitamin B complex; necessary for fat transport in the body; acts as a donor of labile methyl groups.

DIET—Daily allowance or intake of food and drink.

DIET, ACID-FORMING—A diet* in which the total acid ash exceeds the total basic ash. *See* Acid ash residue.

DIET, ALKALI-FORMING—A diet* in which the total basic ash exceeds the *total acid ash. See Alkaline ash residue.*

DIET, BLAND—A diet* composed of mild-flavored food. (See p. 37 in text.)

DIET, CALORIC, HIGH—A diet* which has a prescribed caloric value above the total energy requirement.

DIET, CALORIC, LOW—A diet* which has a prescribed caloric value below the total energy requirement.

DIET, CHOLESTEROL, LOW—A diet* in which the intake of total cholesterol is restricted. The dietary prescription should include the maximum permissible amounts of fat and cholesterol. (See p. 57 in text.)

DIET, ELIMINATION—An allowance of foods which do not commonly produce sensitivity in human patients. Used for the diagnosis of food allergy.

DIET, FAT MODIFICATIONS—A diet prescribed to meet a specified level of fat in the diet, a percentage of fat calories, or specified amounts or ratios of fatty acids.

DIET, FIBER, HIGH—A normal diet, including an additional 2–3* servings of foods high in indigestible carbohydrate and an unrestricted amount of connective tissue.

DIET, FIBER, LOW—A diet* which contains a minimum of indigestible carbohydrates and no tough connective tissue.

DIET, FULL HOSPITAL—*A normal diet* for patients who do not require dietary* modifications for therapeutic purposes; also known as House, Regular, or General diet.

* This diet may be planned so as to meet the Recommended Dietary Allowances *of the Food and Nutrition Board, National Research Council (1958),* for healthy persons.

DIET, GENERAL—*See* Diet, full hospital.

DIET, GLIADIN-RESTRICTED—A diet without wheat, rye, oats, and barley. (See p. 68 in text.)

DIET, "GLUTEN-FREE"—*See* Gliadin-restricted diet (p. 68 in text).

DIET, HOUSE—*See* Diet, full hospital.

DIET, KETOGENIC—A diet in which the ratio of fatty acid (ketogenic) value to glucose (antiketogenic) value equals 2 or more, i.e., sufficiently high to produce ketosis. It provides small amounts of carbohydrate, approximately 1 gm. protein per kilogram of body weight, and sufficient fat to meet full caloric requirements.

DIET, LIQUID, CLEAR—This diet is most often used pre- and postoperatively. It supplies fluids but is of little importance nutritionally. Only fat-free broth, tea, and coffee with sugar but without milk or cream are allowed. Occasionally small amounts of ginger ale, clear fruit or vegetable juice, and gelatin may be added.

DIET, LIQUID, FULL—A diet* consisting of a variety of foods that are liquid or liquefy at body temperature.

DIET, PROTEIN MODIFICATIONS—A diet prescribed to provide a specified level of protein, or protein fraction, or a specified ratio or amount of amino acids.

DIET, PURINE, LOW—A diet* in which sources of purines, such as glandular organs, dried legumes, and meat extractives are eliminated. Other meat and fish may be restricted to 4 oz weekly, thus reducing the daily intake of uric acid equivalent to approximately 35 mg

DIET, REGULAR—*See* Diet, full hospital.

DIET, SALT, LOW—*See* Diet, sodium-restricted.

DIET, SODIUM-RESTRICTED—A diet in which the sodium content is limited to a prescribed level (See p. 89 in text)

DIET, SOFT—A diet* modified in consistency, i.e., including liquid foods and those solid foods which contain a restricted amount of indigestible carbohydrate and connective tissue. (See p 36 in text.)

DIET, TEST—A meal or meals used for diagnostic purposes See *Annual Reports and Proceedings, American Dietetic Association*, (1945–46), p 35

DIET, THERAPEUTIC—A diet based on the normal diet and designed to meet the requirements of a given situation It may be modified in individual nutritive constituents, caloric value, consistency, flavor, technics of service and preparation, content of specific foods, or a combination of these factors.

DIETARY ALLOWANCES, RECOMMENDED (R D A.)—The amounts of various nutrients recommended by the Food and Nutrition Board of the National Research Council, as normally desirable objectives toward which to aim in planning practical dietaries in the United States, enough higher than the minimal requirements of average individuals to cover substantially all individual variations in the requirements of persons in normal health. Allowances are based on average body size and are stated for men and women at moderate physical activity, for pregnancy and lactation, and for children and adolescent boys and girls of various age groups. See text of the *Recommended Dietary Allowances, Revised, 1958* (NAS-NRC Pub No 589), for needs of nutrients for which allowances have not been proposed.

DIETARY CONSULTANT† (profess. & kin.)—Consultant dietitian. Advises and gives assistance to public and private establishments concerned with group feeding, such as child-care centers, hospitals, nursing homes, and schools on a variety of problems relating to management of food service units and application of science of nutrition: assists in planning, organizing, and conducting educational activities, such as in-service training courses, conferences, and institutes for food service managers, food handlers, and persons other than dietetic workers. Develops and evaluates informational material. Studies food service practices and facilities and makes recommendations for improvement. Works with architects and equipment [illegible]
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department as consultant on nutrition programs for institutions.

DIETARY STANDARD FOR CANADA (CANADIAN COUNCIL ON NUTRITION)—The amounts of various nutrients considered to be necessary for normal persons; designed to indicate a "nutritional floor" beneath which the maintenance of health in people cannot be assumed; based on body size, age, sex, kind and extent of activity, with no extra allowance for margins of safety (L. B. Pett, Limitations in the use of dietary standards: differences in American, British and Canadian standards, J. Am. Dietet. A, 27:28–31, 1951).

DIETARY STANDARDS, BRITISH (COMMITTEE ON NUTRITION, BRITISH MEDICAL ASSOCIATION)—The amounts of various nutrients "believed to be sufficient to establish and maintain a good nutritional state in representative individuals of the groups concerned." These standards refer to the average requirements and are presented with the understanding that "in every group there must be cases where the need for one or other nutrient is greater than that of the average" (L. B. Pett, Limitations in the use of dietary standards: differences in American, British and Canadian Standards, J. Am. Dietet. A., 27:28–31, 1951).

DIETETIC INTERN† (profess. & kin.) 0-39.931—Performs duties of a dietitian and follows a planned educational program while serving in an approved hospital or other institutions offering food service under designated management for a specified length of time following graduation from an accredited university or college; to gain practical experience as a requirement for many dietary occupations.

DIETETICS—The combined science and art of feeding individuals or groups under different economic or health conditions according to the principles of nutrition and management.

DIETITIAN—One who has a degree and advanced education or qualifying experience in the sciences of nutrition and management.

DIETITIAN† (profess. & kin.) 0-39.93—Applies principles of nutrition to feeding of individuals and groups; plans menus and special diets to provide food energy and nutrients. Supervises preparation and serving of meals. Maintains food cost controls. Instructs individuals and groups in the principles

† Reference to these definitions is as follows: Occupational Analysis Branch, U.S. Employment Service, *Dictionary of Occupational Titles, Second Edition*, Suppl. 1 (Washington. U.S. Department of Labor, Bureau of Employment Security, Division of Placement Methods, March, 1955)

of nutrition as applied to the selection of food and prepares educational materials on nutritional value of foods and methods of preparation Purchases food, equipment, and supplies; inspects work areas and storage facilities for sanitary conditions.

DIETITIAN, ADMINISTRATIVE† (profess. & kin.)—Executive dietitian Administers and directs food service program in hospital, school, restaurant, club, or other public or private institution Organizes program and establishes procedures in conformance with administrative policies. Selects and trains personnel. Plans menus and supervises preparation and serving of meals. Co-ordinates dietary service with activities of other departments. Determines that sanitary and safety standards are maintained. Purchases food, equipment, and supplies. Supervises maintenance of records and reports.

DIETITIAN, TEACHING† (profess & kin.)—Nutritionist. Instructs classes in dietetics, nutrition, and institution management or directs educational program for dietetic interns, student nurses, and medical personnel. Prepares manual and course outline; lectures to students on composition and value of foods, principles of nutrition, menu planning, diet therapy, sanitation, food cost control, marketing, and administration of dietary department. Assigns dietetic interns to specific cases for study or diet formulation and evaluates results. Provides dietary instruction to individual patients in hospital or public health center May engage in research

DIETITIAN, THERAPEUTIC† (profess & kin)—Supervises preparation and serving of special diets in accordance with prescription of a physician. Formulates menus for therapeutic diets to provide indicated proportions of nutritional elements and in accordance with patient's food habits and preference. Instructs kitchen personnel in type and quantity of food to be prepared and method to be employed. Inspects meals for conformance to prescribed diet and standards of palatability and appearance. Participates in training of interns and instructs patients in diet therapy and foods and nutrition. May engage in research related to therapeutic diets.

DIGESTIBILITY, COEFFICIENT OF—The percentages of the carbohydrate, protein, and fat content of a food, which become available to the body for absorption

DIGESTION—The process of converting food into substances which can be absorbed by the body.

EDIBLE PORTION (E.P.)—As used in food value tables, this term refers to that part of a food which is most commonly eaten Some parts, such as parings of potatoes, which are edible but not usually eaten, are excluded.

ENERGY, FOOD—Expressed in calories per unit of weight. The Atwater system of caloric values has been in common use in the United States for many years According to this system, the general caloric factors 4, 9, and 4 are applied to food composition in grams of protein, fat, and carbohydrate, respectively. These general factors allow for average losses in digestion and for incomplete oxidation of protein in the body, they are applicable to diets similar to the average American diet but are inaccurate when applied to diets of widely different composition or to individual foods. For this reason, the Committee on Calorie Conversion Factors and Food Composition, of the Nutrition Division of the Food and Agriculture Organization, prepared a list of values, derived from Atwater's original data and more recent investigations, which are applicable to the individual foods specified and,

with relatively small errors, to all foods within certain groups. The revised procedure advocated by the Committee on Calorie Conversion Factors and Food Composition was used in the preparation of U.S. Department of Agriculture Handbook No. 8, *Composition of Foods—Raw, Processed, Prepared* (June, 1950).

ENRICHED BREAD—May be made from enriched flour or by the addition of the required substances to the baker's formula or by the use of special high-vitamin yeast and iron. *See* Enriched flour.

ENRICHED FLOUR—White flour enhanced in thiamine, riboflavin, niacin, and iron value by changing the milling process to retain these constituents or by addition of the chemicals to white flour. The minimum levels specified in the standards of identity promulgated under the Food, Drug and Cosmetic Act are: thiamine, 2.0 mg.; riboflavin, 1.2 mg.; niacin, 16 mg.; and iron, 13 mg. per pound. Certain levels of vitamin D and calcium are permitted as optional ingredients. States which require enrichment of white flour have generally been guided by the federal legislation.

ERGOSTEROL ($C_{28}H_{44}O$)—A plant sterol found chiefly in yeast, which, upon being irradiated, forms calciferol (vitamin D_2).

EXTRINSIC FACTOR (CASTLE'S)—The factor supplied by food which, when present with the intrinsic factor, produces hemopoietic effects; vitamin B_{12}.

FAT—A glyceryl ester of fatty acids, which on hydrolysis yields three molecules of fatty acid and one of glycerol. In food tables, figures for fat include, in addition to true fats, other ether-extractable substances.

FIBER—As used in reference to therapeutic diets, this term includes indigestible organic tissue, either plant or animal.

FIBER, CRUDE—Made up largely of cellulose, those hemicelluloses which are not readily soluble, and lignin; as usually determined, that portion of a food sample which resists solution when boiled in dilute acid and dilute alkali.

FOLACIN—Generic term for a group of vitamins belonging to the B complex, including pteroylglutamic acid ($C_{19}H_{19}N_7O_6$) and its conjugates. Effective in the treatment of sprue and nutritional macrocytic anemia; promotes blood regeneration but does not prevent neurological complications in pernicious anemia. Folinic acid (citrovorum factor) is an important metabolite of folacin and may be the form active in cellular metabolism. Ascorbic acid is essential for normal conversion of folacin to folinic acid. Abundant in green leafy vegetables, liver, kidney, and yeast. A dietary intake of less than 1 mg. daily will probably cover nutritional needs for folacin activity. For folic acid content of foods, see Agriculture Handbook No. 29, *Folic Acid Content of Foods* (Washington: U.S. Department of Agriculture, 1951), by E.W. Toepfer, E. G. Zook, M. L. Orr, and L. R. Richardson, Bureau of Human Nutrition and Home Economics.

FOOD EXCHANGES—Lists of foods grouped in terms of approximate equivalents in carbohydrate, protein, and fat content; used for the purpose of planning diabetic, low-caloric, and other measured diets.

FORTIFIED FOOD—A food to which a vitamin or other dietary essential has been added in such an amount as to make the total content larger than that contained in any natural (unprocessed) food of its class—for example, vitamin D milk and fortified margarine.

FORTIFIED MARGARINE—Most of the margarine on the market in the United States is fortified with 15,000 I U. of vitamin A per pound.

GLYCOGEN—A polysaccaride, also known as "animal starch," which yields glucose on hydrolysis; found in liver, muscle, and other tissues.

GOITER, SIMPLE—Enlargement of the thyroid gland, caused by an absolute or relative deficiency of iodine.

HEMICELLULOSE—A group of polysaccharides forming part of the cell wall of plants; indigestible but may be broken down to a considerable extent by intestinal flora. It also absorbs water. *See* Fiber, crude.

INORGANIC ELEMENTS—*See* Ash; Minerals

INSULIN—The hormone derived from the beta cells of the islands of Langerhans of the pancreas; essential for normal carbohydrate metabolism. Commercial preparations of insulin include regular, crystalline, protamine zinc, globin, NPH-50, and Lente.

INTRINSIC FACTOR (CASTLE'S)—A factor other than HCl, present in normal gastric juice in man but deficient in the gastric juice of the pernicious anemia patient.

KETOSIS—A condition in which there is an accumulation in the body of ketone compounds (beta-hydroxybutyric acid, acetoacetic acid, and acetone) as a result of incomplete oxidation of fatty acids, occurs when the amount of fat being oxidized is excessive, as with the use of ketogenic diets, in semi-starvation, and uncontrolled diabetes

LIGNIN—A constituent of crude fiber, occurring in the cell wall of plants; resistant to hydrolysis by digestive enzymes, strong acids, and alkalies; not attacked to any extent by the intestinal flora. *See* Carbohydrate, indigestible; Fiber, crude.

LIPIDS—Fat or fatlike substances.

MALNUTRITION—A condition of the body resulting from an inadequate supply or impaired utilization of one or more of the essential food constituents.

MALNUTRITION, CONDITIONED—Deficiency of one or more nutrients in the tissues, caused by factors other than inadequate diet alone—for example, deficiencies caused by factors which interfere with ingestion, digestion, absorption, or utilization of essential nutrients or by factors that increase their requirement, destruction, or excretion

MENADIONE ($C_{11}H_8O_2$)—*A synthetic compound,* having greater vitamin K activity than the naturally occurring vitamin, used as a reference standard for biological assays of vitamin K Some water-soluble derivatives of menadione have been prepared.

METABOLISM—A general term to designate all chemical changes which occur to substances within the body after absorption These changes include constructive (anabolic) and destructive (catabolic) processes.

MICRONUTRIENTS—Nutrients present in very small amounts in food, as applied to mineral elements, the term usually refers to those present in the body in amounts less than that of iron, as manganese, copper, iodine, cobalt, molybdenum, and zinc.

MINERALS—"Inorganic" elements. The following are known to be present in body tissue: calcium, cobalt, chlorine, copper, fluorine, iodine, iron, magnesium, manganese, molybdenum, phosphorus, potassium, sodium, sulfur, zinc. Mineral constituents, obtained from food, aid in the regulation of the

acid-base balance of body fluids and of osmotic pressure, in addition to specific function of individual elements in the body. Some minerals are prese in the body largely in organic combination, as iron in hemoglobin an iodine in thyroxine; others occur in the body in inorganic form, as calciur salts in bone, sodium and chlorine as sodium chloride. The terms "minerals' and "inorganic elements" do not imply that the element occurs in inorganic form in food or body tissue. *See* Ash.

NIACIN (C_5H_4NCOOH)—A water-soluble, heat-stable member of the vitamin B complex, also known as "nicotinic acid " The antipellagra factor. In nature it occurs chiefly as the acid amide; may be formed in the body from tryptophan

NIACIN AMIDE ($C_5H_4NCONH_2$)—The amide of niacin, found in the body as a constituent of coenzymes I and II, which are essential for carbohydrate metabolism

NIACIN EQUIVALENT—Recommended Dietary Allowances (1958) for niacin are expressed by the Food and Nutrition Board of the National Research Council as niacin equivalents on the assumption that 60 mg. tryptophan may be converted to 1 mg. niacin.

NICOTINAMIDE—*See* Niacin amide.

NUTRIENT—Any substance useful in nutrition—for example, proteins, fats, carbohydrates, minerals, vitamins, water. *See* Nutrition.

NUTRITION—The combination of processes by which the living organism receives and utilizes the materials necessary for the maintenance of its functions and for the growth and renewal of its components.

NUTRITION, NORMAL—A condition of the body resulting from the efficient utilization of sufficient amounts of the essential nutrients provided in the food intake.

NUTRITIONAL STATUS—The condition of the body resulting from the utilization of the essential nutrients available to the body. Nutritional status may be good, fair, or poor, depending not only on the intake of dietary essentials but on the relative need and the body's ability to utilize them. *See* Nutriture.

NUTRITIONIST—One who has a degree and advanced education or qualifying experience in public health nutrition.

NUTRITIONIST† (profess & kin.) II—Applies science of nutrition to promotion of health and control of disease. Instructs auxiliary medical personnel and other allied professional workers on foods and science of nutrition. Advises public and private health agencies on nutrition phases of their programs, engaging in such activities as in-service training and clinic and community services Participates in surveys concerning nutrition, gathering such information as food case histories.

NUTRITURE—Condition as to nourishment, either with respect to all nutrients (general nutriture) or to one nutrient at a time.

PELLAGRA—A disease caused by the lack of niacin equivalent, usually associated with deficiencies of other B vitamins. Signs and symptoms involve the skin, gastrointestinal tract, and nervous system.

PROTEIN—A nitrogenous compound which yields amino acids on hydrolysis; proteins are essential constituents of all living cells and the most abundant of the organic compounds in the body. Protein values as stated in food value tables are generally calculated from total nitrogen content and include, in

addition to true protein, other nitrogenous compounds, such as amino acids and purine bases. *See* Acids, amino, essential.

PROTEIN, BIOLOGICAL VALUE OF—The percentage of absorbed nitrogen that is retained by the body. The numerical value obtained varies with the conditions of the experiment.

PROTEIN, DIGESTIBILITY OF—The percentage of consumed nitrogen that is absorbed. In general, values are higher for proteins of animal origin than for those of vegetable origin.

PROTEIN, SUPPLEMENTARY EFFECT—The ability of one protein to supply amino acids in which another protein is deficient, so that from the mixture of the proteins an adequate intake of amino acids is secured.

PROTEIN HYDROLYSATE—A mixture of amino acids and polypeptides prepared by the digestion of proteins by (1) acids, (2) alkalies, or (3) proteolytic enzymes. Properly prepared hydrolysates may be used for either oral or parenteral administration. Some methods of hydrolysis lead to the destruction of certain essential amino acids

PROVITAMIN—The precursor of a vitamin. *See* Carotene; Ergosterol.

PROXIMATE COMPOSITION—As applied to food, the term usually includes the percentages of protein, fat, total carbohydrate, ash, and water; calorie values may also be included.

PTEROYLGLUTAMIC ACID (PGA)—One of the compounds of the folic acid group. *See* Folacin

PYRIDOXINE—*See* Vitamin B_6.

REFUSE—That portion of foods as found on the retail market which is inedible (as bones, pits, and shells) or usually discarded in preparation of food for the table (as potato parings and tough outer leaves of vegetables) In food values expressed on the "as purchased" basis, nutrients in refuse are disregarded.

REQUIREMENTS—Although the average minimal requirements for various nutrients cannot be stated with accuracy, certain "minimum daily requirements" for food-labeling purposes have been designated in regulations for enforcement of the Federal Food, Drug and Cosmetic Act (see *Federal Register*, 6:5921–26, 1941, and 22:3841, 1957). These should not be confused with the Recommended Dietary Allowances.

RESEARCH NUTRITIONIST† (profess & kin)—Dietitian, research. Originates or assists in planning, organizing, and conducting programs in nutritional research. Performs essential research toward improvement of food as it relates to acceptability and physiological efficiency Studies and analyzes recent scientific findings in nutrition for application in present nutritional research and in developing tools for planning future research.

RESIDUE, FECAL—The total solid of feces made up of undigested and unabsorbed food and metabolic and bacterial products Some foods, such as milk, which contain no fiber may increase fecal residue.

RIBOFLAVIN ($C_{17}H_{20}N_4O_6$)—A member of the vitamin B complex; a water-soluble, heat-stable, yellow pigment having green fluorescence; essential as a constituent of several enzyme systems concerned with tissue respiration; destroyed by visible light, particularly blue and violet rays.

RICKETS—A disturbance in mineral metabolism occurring in infancy and childhood, in which calcification of the growing bone does not take place normally.

It occurs when the supplies of calcium, phosphorus, and vitamin D are no[t] adequate to meet functional needs.

SALT, IODIZED—Table salt (sodium chloride) to which has been added 1 part per 10,000 of iodine as potassium iodide.

SATIETY VALUE—That quality of food contributing to satisfaction and resulting in a sustained sense of comfort or well-being.

SCURVY—A disease due to deficiency intake or faulty utilization of ascorbic acid. Infantile and adult scurvy differ in their clinical manifestations. *See* Acid, ascorbic.

SPRUE—A syndrome which usually responds to folic acid therapy but which has not been established as a dietary deficiency disease. Characterized by glossitis, diarrhea with increased fat in stools, impaired absorption of fat-soluble vitamins, flat oral glucose tolerance curve, and a macrocytic anemia associated with megaloblastic bone marrow.

THIAMINE ($C_{12}H_{17}N_4OS$)—Member of the B complex; the antiberiberi factor; a water-soluble, heat-labile vitamin; essential for growth and as a constituent of cocarboxylase; therefore functioning in carbohydrate metabolism.

TOCOPHEROL, ALPHA ($C_{29}H_{50}O_2$)—One of several tocopherols with vitamin E activity. Fat-soluble and heat-stable in the absence of oxygen; widely distributed in plant and animal tissues; may protect other fat-soluble vitamins from oxidative destruction in the intestinal tract. No clinical or physiologic correlates of low levels of serum tocopherol in humans have been reported, but the reversal of creatinuria following tocopherol administration to patients with absorptive defects and the finding of lesions similar to those of muscular dystrophy and of ceroid pigment in such patients suggests that vitamin E plays a role in human nutrition. In physically normal adults, an appreciable degree of erythrocyte hemolysis and depression of plasma tocopherol occurred only after 12–22 months of a diet containing 2 mg. *d*-alpha tocopherol daily. The daily adult per capital consumption of vitamin E in the United States has been estimated to be 14 mg.

TRACE ELEMENTS—Minerals occurring in small amounts in food or body tissues; those which are known to be dietary essentials are also called "micronutrients." *See* Micronutrients

UNIT, INTERNATIONAL VITAMIN (I.U.)—A definite quantity of each International Standard of Reference, used for expressing the content of the respective vitamins in foods and other materials. Such units have been established for vitamins A, C, D, and thiamine but are used principally for vitamins A and D, since values for thiamine and vitamin C can now be conveniently expressed in weights. Originally established by a committee appointed by the Health Organization of the League of Nations, standardization of vitamin units is now under the supervision of subcommittees of the World Health Organization.

UNIT, INTERNATIONAL VITAMIN A—The activity of 0.344 μg. of vitamin A acetate; equal in biologic activity to 0.3 μg. of vitamin A alcohol and of 0.6 μg of the provitamin β-carotene.

[U]NIT, INTERNATIONAL VITAMIN B_1—The vitamin B_1 activity of 3.0 μg. of the International Standard crystalline thiamine hydrochloride (vitamin B_1), therefore 1 mg. thiamine equals 333 I.U.

[UN]IT, INTERNATIONAL VITAMIN C—The vitamin C activity of 0.05 mg. of the International Standard crystalline ascorbic acid (vitamin C).

UNIT, INTERNATIONAL VITAMIN D—The vitamin D activity of the International Standard solution of irradiated ergosterol in oil, containing 0.025 µg. (0.000025 mg.) of calciferol.

UNIT, U.S.P. (United States Pharmacopoeia)—Equal to the corresponding International Units.

VIOSTEROL—A solution of irradiated ergosterol in oil in which the active agent is calciferol (vitamin D_2).

[illegible]

functions or reactions to proceed normally.

VITAMIN A ($C_{20}H_{29}OH$)—A fat-soluble vitamin occurring in some foods of animal origin but formed in the animal body from plant precursors, essential for growth, regeneration of visual purple, and normal functioning of epithelial tissue. *See* Carotene.

VITAMIN A VALUE—The combined potency of a food or diet, represented by its content of vitamin A, carotene, and other plant precursors.

VITAMIN B_1—*See* Thiamine.

VITAMIN B_2, G—Obsolete; formerly used to designate fractions of vitamin B complex, especially riboflavin.

VITAMIN B_6—A group name applied to three closely related compounds: pyridoxine ($C_8H_{11}O_3N$) in plant products; pyridoxal ($C_8H_9O_3N$) and pyridoxamine ($C_8H_{12}O_2N_2$) in animal products. A water-soluble, heat-stable vitamin which is related to methionine and protein need. Choline, essential acids, biotin, and pantothenic acid decrease the requirement. The evidence available from animal experiments and tests on human volunteers indicates that the daily intake of vitamin B_6 should be from 1 to 2 mg., an amount readily provided by ordinary mixed diets.

VITAMIN B_{12}—A group name applied to several closely related red crystalline compounds containing cobalt, including cyanacobalamin ($C_{63}H_{90}N_{14}O_{14}PCo$), hydroxycobalamin, and others. Dietary deficiency has been observed in human beings who have lived on a strict vegetarian diet for several years. Lack of the intrinsic factor of Castle, as seen in spontaneously developing pernicious anemia or following gastrectomy, may be controlled by the parenteral administration of approximately 1 µg. of the vitamin daily. Failure of absorption of the vitamin occurs in the absence of the intrinsic factor, although massive oral doses, i.e., 1 mg. or so, may be therapeutically effective. Bacterial or parasitic interference and a basic defect of the intestines, as found in non-tropical sprue, may also result in failure to absorb the vitamin. The ingestion of 1 cup of fluid cow's milk, 4 oz. of meat, and 1 egg per day would provide 2–4 µg. vitamin B_{12}. The intake from food may be increased to 15–20 µg. per day by the use of beef liver or kidney.

VITAMIN B COMPLEX—As originally used, this term referred to the water-soluble vitamins occurring in yeast, liver, meats, and whole-grain cereals, but some of the newer B complex vitamins, for example, folic acid and vitamin B_{12}, do not correspond to this distribution; includes a number of compounds [illegible] thiamine, ribo-
fl [illegible] ol,
a [illegible] d;
a [illegible]

VITAMIN C—*See* Acid, ascorbic.

VITAMIN D—Designates any of several fat-soluble factors related to sterols, which are antirachitic, i.e., functioning in the regulation of calcium and phosphorus metabolism and growth. *See* Calciferol; Vitamin D_3.

VITAMIN D_2—*See* Calciferol.

VITAMIN D_3 ($C_{27}H_{44}O$)—A fat-soluble vitamin, obtained by the ultraviolet-ray activation of 7-dehydrocholesterol; occurs in fish-liver oils and in irradiated foods of animal origin; termed "natural" vitamin D.

VITAMIN D MILK—May be produced by three different methods: (1) "fortified" milk, which is now more generally distributed than the other types, is that to which a vitamin D concentrate has been added; (2) "metabolized" milk is produced by feeding the cows irradiated yeast; and (3) "irradiated" milk has been exposed directly to ultraviolet rays The standard amount used for fortification is 400 I.U. vitamin D per quart of fresh or reconstituted milk.

VITAMIN E—*See* Tocopherol, alpha.

VITAMIN INHIBITORS—*See* Antivitamins.

VITAMIN K—A fat-soluble vitamin which is necessary for prothrombin formation Vitamin K_1 ($C_{31}H_{46}O_2$), a yellow oil, is the form which has been isolated from green leaves; vitamin K_2 ($C_{41}H_{56}O_2$), a yellow crystalline compound, has been isolated from putrefied fish meal. These and other natural forms are fat-soluble and require bile salts for absorption, but several water-soluble forms have been synthesized. *See* Menadione.

VITAMINS, FAT-SOLUBLE—Vitamins A, D, E, and K, which are extractable from foods with fat solvents.

VITAMINS, WATER-SOLUBLE—Members of the B complex and vitamin C which can be extracted from foods with water as the solvent.

WATER, ENDOGENOUS—Water which is provided by metabolic processes.

WATER, EXOGENOUS—Water ingested as such or as a component of food. In food value tables, "water" includes volatile substances in addition to free water.

WATER, REQUIREMENT—Determined by body heat production, amounts of dissolved materials to be excreted by the kidney and its concentrating capacity, and losses due to sweating. Water and salt requirements are intimately related. Under ordinary environmental conditions, the daily requirement of a 70-kg. man on a 3,200-calorie diet is about 2,300–3,100 ml., much of which is contained in foods as eaten.

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